293

PROPERTY OF
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3924 MEADE ST.
DENVER, COLORADO

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SILVERTONE CHASSIS 528.34200

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 14 IN SET 279

Silvertone chassis 528.34200 was covered in Photofact Folder 14 — Set 279, along with other chassis.

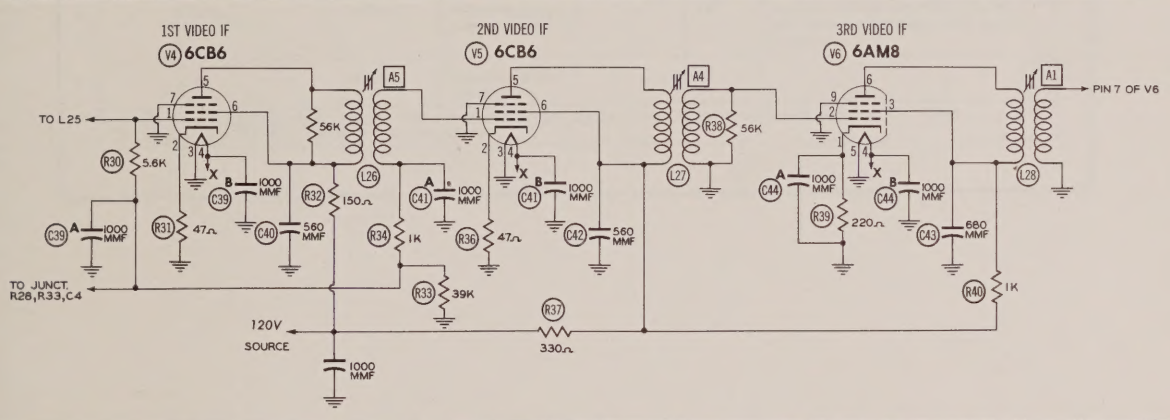
The following production change applies only to models using chassis 528.34200.

NEW VIDEO IF STRIP

L26 (2nd. Video IF Coil) is changed to part # SA192-31. With this new coil the 47.25MC trap is omitted.

L27 (3rd. Video IF Coil) is changed to part #SA192-32.

A partial schematic is given below showing all the changes made in the Video IF strip.



NATIONAL MODEL HORIZON 10

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 10 IN SET 268

National Model Horizon 10 was covered in Photofact Folder 10 — Set 268.

In later production the following changes were made.

R28 is increased from $\frac{1}{2}$ watt to 1 watt.

R26 is increased from 1.2KΩ to 3.9KΩ.

R30 is decreased from 4.7Meg to 3.9Meg.

R29 is decreased from 4.7Meg to 3.9Meg.

A 10KΩ, $\frac{1}{2}$ watt resistor is added in series from the red lead of T1 (power transformer) to M1 (Selenium Rectifier).

NATIONAL MODEL HORIZON 20, 20A

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 11 IN SET 270

National model Horizon 20 and 20A were covered in Photofact Folder 11 — Set 270.

In later production the following changes were made.

R8 is increased from $\frac{1}{2}$ watt to 1 watt.

R10 is decreased from 4.7Meg to 3.9Meg.

R11 is decreased from 4.7Meg to 3.9Meg.

R7 is increased from 1.2KΩ to 3.9KΩ.

A 10KΩ, $\frac{1}{2}$ watt resistor is added in series from the red lead of T1 (power transformer) to M1 (selenium rectifier).

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 8 IN SET 278

PHILCO MODEL 22C4410 (Ch. TV-350)

Philco Models 22C4016, 22C4016L, 22C4124, 22C4124L, 22C4126, 22C4126L, 22C4129, 22C4312 and 22C4312L (TV-350).

Model 22C4410 is electrically identical to the models covered, except for the addition of a radio and phonograph.

A schematic of the radio and alignment procedure are given in this bulletin.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	* Tuning gang fully open	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver.
3.		"	1500KC	Tune to 1500KC signal	"	A6	"

* With tuning gang fully open, insert .006" non-metallic shim between heel of rotor and top of stator plates. Close tuning gang to hold shim. Carefully remove shim.

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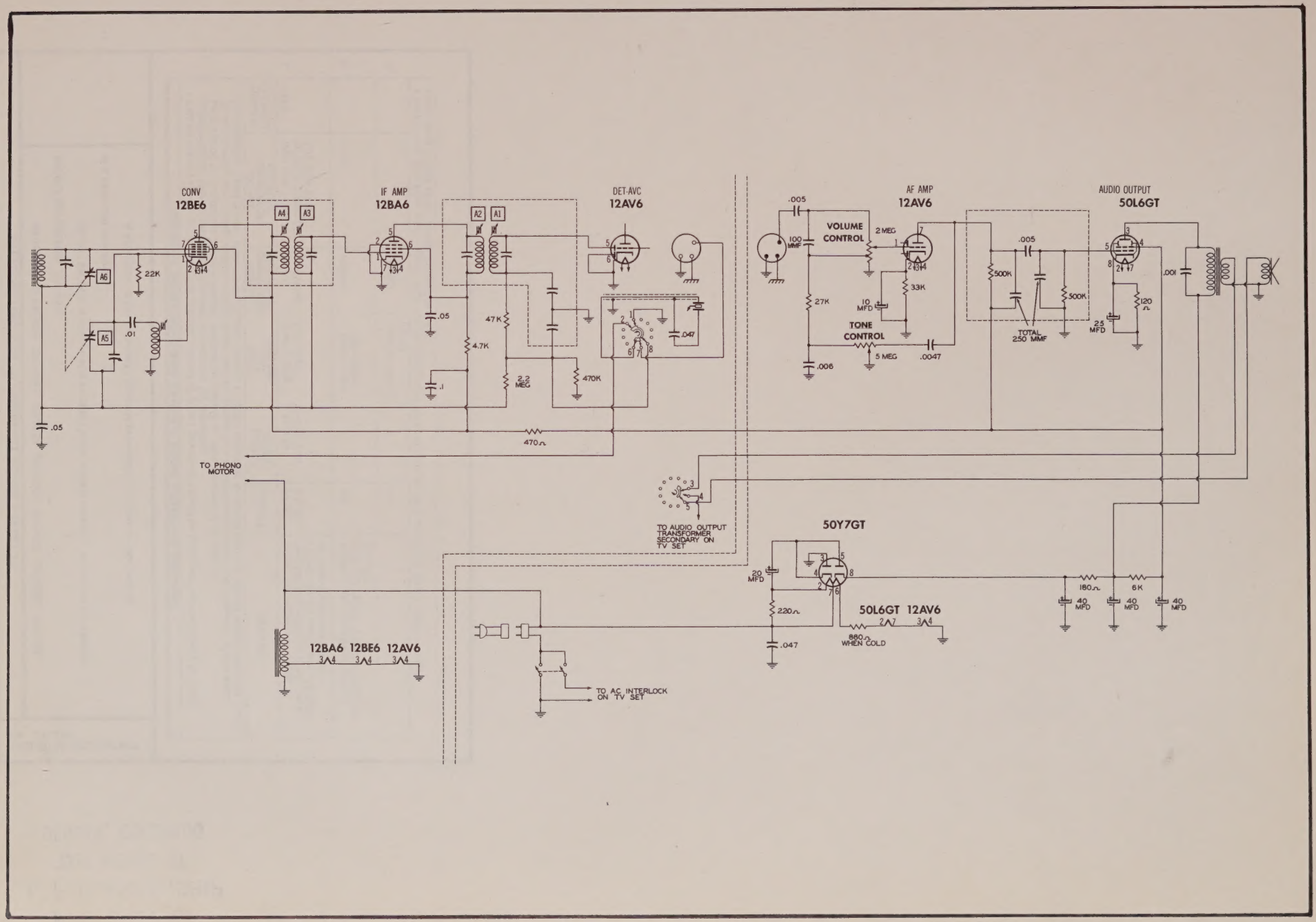
CONV
12BE6
IF AMP
12BA6
DET-AVC
12AV6
AF AMP
12AV6
AUDIO OUTPUT
50L6GT
VOLUME CONTROL
2 MEG
100 MMF
.005
22K
.01
.05
47K
4.7K
2.2 MEG
470K
.1
.047
27K
10 MFD
33K
TONE CONTROL
5 MEG
.0047
.006
500K
TOTAL 250 MMF
120
25 MFD
.001
470Ω
TO PHONO MOTOR
TO AUDIO OUTPUT TRANSFORMER SECONDARY ON TV SET
50Y7GT
20 MFD
220Ω
.047
50L6GT 12AV6
880Ω WHEN COLD
180Ω
6K
40 MFD
40 MFD
40 MFD
12BA6 12BE6 12AV6
TO AC INTERLOCK ON TV SET

PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

CBS-COLUMBIA MODELS 205C1, 205C2

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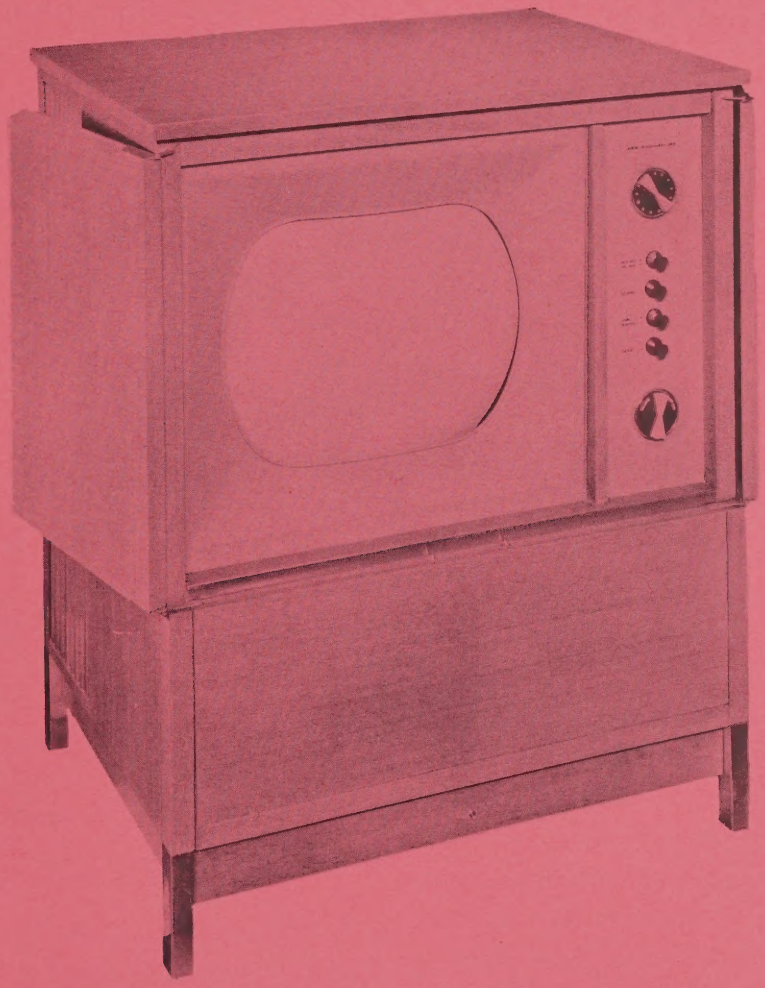
The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



MODEL 205C2

CBS-COLUMBIA MODELS 205C1, 205C2

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DATE 10–55 SET 293 FOLDER 2

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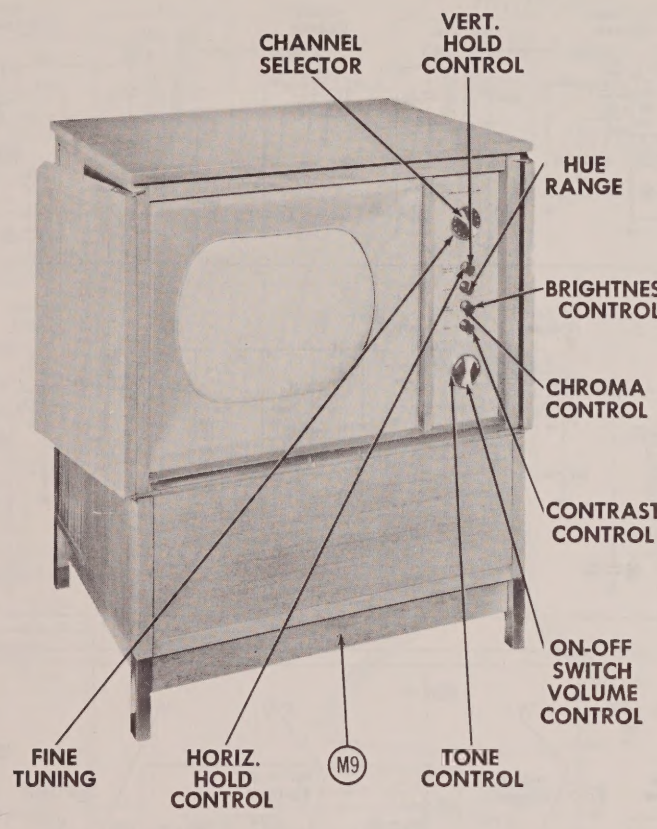

CBS-COLUMBIA MODEL 205C2

TRADE NAME	CBS-Columbia Models 205C1, 205C2
MANUFACTURER	CBS-Columbia, A Div. of Columbia Broadcasting System, Inc., 48-50 34th. St., Long Island City, N.Y.
TYPE SET	Color Television Receiver
TUBES	Forty-five
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 4.9 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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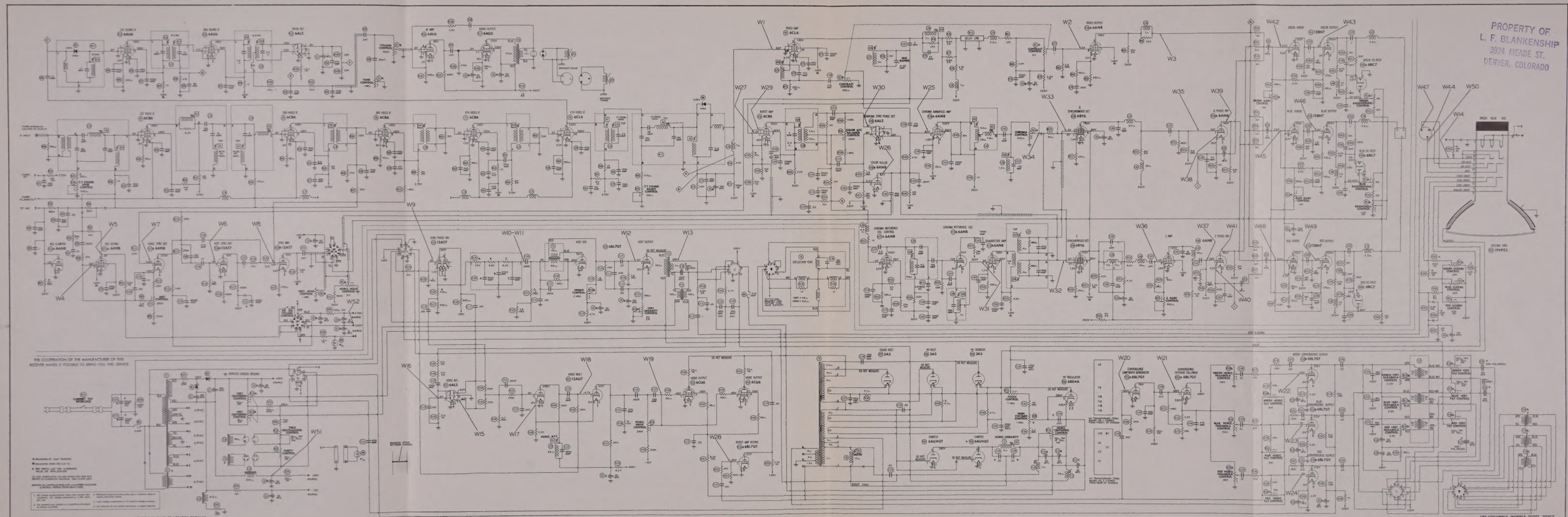
CBS-COLUMBIA MODELS 205C1, 205C2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CBS-COLUMBIA MODELS 205C1, 205C2
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE.
A PHOTOFACT STANDARD NOTATION REFERENCE
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10-W11
W12
W13
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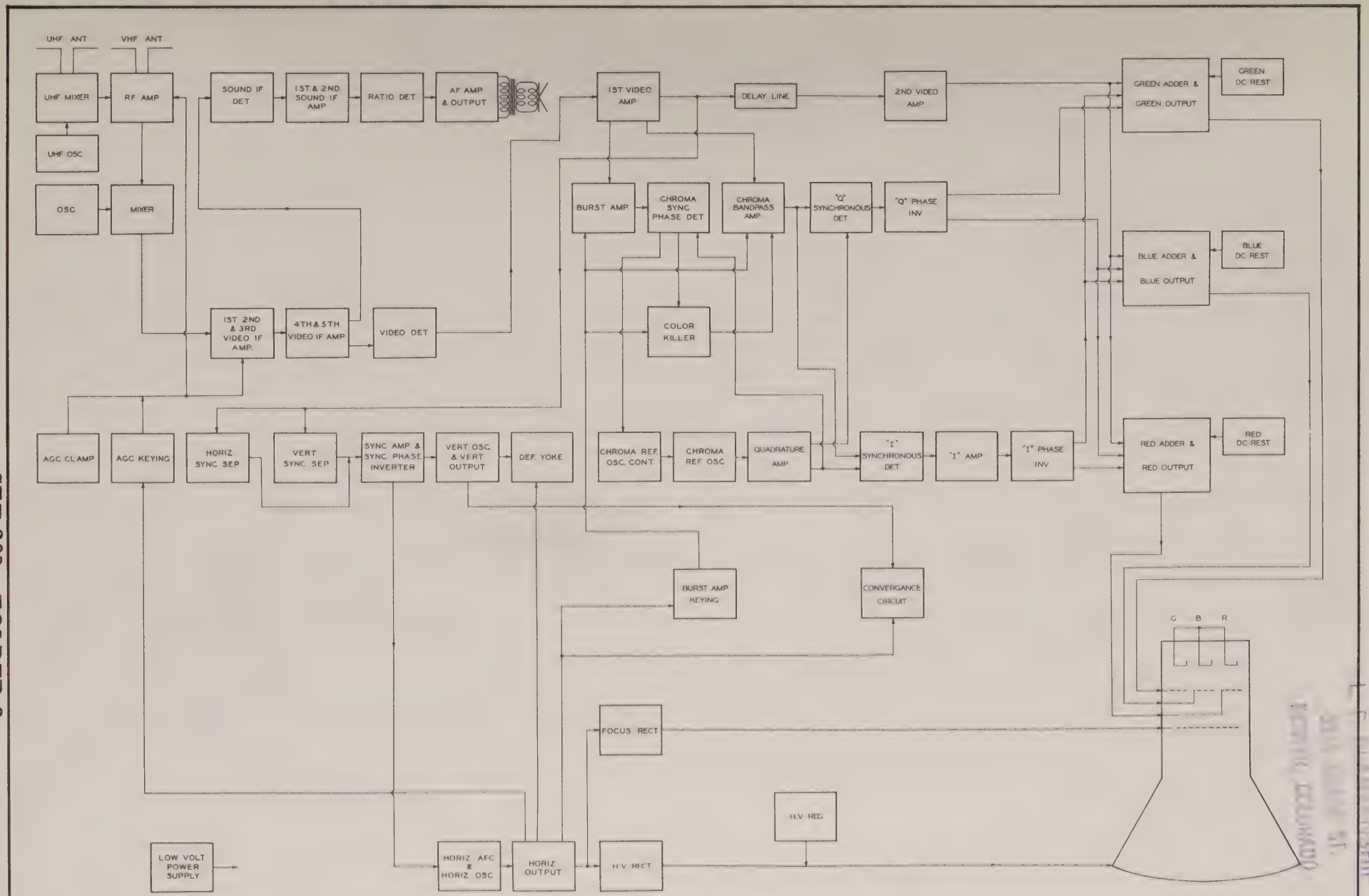

BLOCK DIAGRAM

CBS-COLUMBIA MODELS 205C1, 205C2

SET 293 FOLDER 2

PAGE 3

PROPERTY OF

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6T4	*‡6KΩ	8.2KΩ	.1Ω	0Ω	0Ω	8.2KΩ	*‡ 6KΩ		
V2	6BZ7	†3.6KΩ	130KΩ	Inf.	0Ω	.1Ω	Inf.	800KΩ	15Ω	0Ω
V3	6U8	‡3.6KΩ	200KΩ	‡11KΩ	.1Ω	0Ω	†1.3KΩ	0Ω	0Ω	10KΩ
V4	6CB6	50KΩ	62Ω	0Ω	.1Ω	† 11KΩ	†47KΩ	0Ω		
V5	6CB6	50KΩ	62Ω	.1Ω	0Ω	†11KΩ	†11KΩ	0Ω		
V6	6CB6	27KΩ	62Ω	0Ω	.1Ω	†11KΩ	†11KΩ	0Ω		
V7	6CB6	.2Ω	180Ω	.1Ω	0Ω	†11KΩ	‡1.3KΩ	0Ω		
V8	6CL6	180Ω	.2Ω	†12KΩ	.1Ω	0Ω	‡1.6KΩ	0Ω	†12KΩ	.2Ω
V9	6CL6	220Ω	8KΩ	‡550Ω	.1Ω	0Ω	†6KΩ	0Ω	‡550Ω	8KΩ
V10	6AN8	†13KΩ	390KΩ	3KΩ	.1Ω	0Ω	†11KΩ	‡550Ω	2.2Meg	220Ω
V11	6AN8	‡6.6KΩ	†28KΩ	600KΩ	0Ω	.1Ω	300KΩ	†500Ω	4.5Meg	‡ 550Ω
V12	6AN8	750KΩ	750KΩ	0Ω	.1Ω	0Ω	‡ 2.7KΩ	‡ 2.7KΩ	.9Ω	220Ω
V13	6AU6	5.5Ω	0Ω	0Ω	.1Ω	‡1.5KΩ	‡1.5KΩ	220Ω		
V14	6AU6	47KΩ	0Ω	0Ω	.1Ω	‡1.5KΩ	‡1.5KΩ	0Ω		
V15	6AL5	Inf.	Inf.	.9Ω	0Ω	0Ω	0Ω	44KΩ		
V16	6AV6	150KΩ	820Ω	.1Ω	0Ω	0Ω	0Ω	† 220KΩ		
V17	6AQ5	470KΩ	330Ω	.1Ω	0Ω	†2.1KΩ	† 1.5KΩ	470KΩ		
V18	12AT7	†350KΩ	2.2Meg	0Ω	.1Ω	.1Ω	†6KΩ	†1Meg	470Ω	0Ω
V19	12AT7	‡1.4KΩ	1Meg	1.3KΩ	0Ω	0Ω	NC	NC	NC	.1Ω
V20	6BL7GT	1.8Meg	†3Meg	0Ω	3.9Meg	†1KΩ	800Ω	.1Ω	0Ω	
V21	6AL5	27KΩ	27KΩ	0Ω	.1Ω	4.8Meg	0Ω	4.8Meg		
V22	12AU7	†15KΩ	5Meg	2.2KΩ	.1Ω	.1Ω	†160KΩ	110KΩ	2.2KΩ	0Ω
V23	6CU6	TP	.1Ω	TP	†8.2KΩ	550KΩ	NC	0Ω	0Ω	
V24	6CU6	TP	0Ω	TP	†8.2KΩ	550KΩ	NC	.1Ω	0Ω	
V25	6AU4GT	NC	NC	Inf.	NC	†45Ω	NC	.1Ω	0Ω	
V26	6AU4GT	NC	NC	Inf.	NC	†45Ω	NC	.1Ω	0Ω	
V27	3A3	Inf.	50Meg	Inf.	50Meg	Inf.	Inf.	50Meg	Inf.	TOP CAP ▲95Ω
V28	3A3	PINS	1-8	HAVE	INF	RESISTANCE				TOP CAP 50Meg
V29	3A3	PINS	1-8	HAVE	INF	RESISTANCE				TOP CAP Inf.
V30	6BD4A	†4Ω	Inf.	NC	NC	2.5Meg	NC	Inf.	NC	TOP CAP Inf.
V31	6BL7GT	100KΩ	†120KΩ	0Ω	60KΩ	†27KΩ	2.2KΩ	.1Ω	0Ω	
V32	6BL7GT	1Meg	10KΩ	25KΩ	60KΩ	†27KΩ	2.2KΩ	.1Ω	0Ω	
V33	6BL7GT	100KΩ	‡3.2KΩ	0Ω	60KΩ	†27KΩ	2.2KΩ	.1Ω	0Ω	
V34	6AN8	‡11KΩ	100Meg	0Ω	.1Ω	0Ω	†1.5KΩ	†1.5KΩ	‡16KΩ	‡700Ω
V35	6CB6	3Ω	‡17KΩ	.1Ω	0Ω	†2.7KΩ	†2.7KΩ	‡17KΩ		
V36	6AL5	.5Ω	.5Ω	.1Ω	0Ω	100Meg	0Ω	100Meg		
V37	6AN8	†40KΩ	150KΩ	1.5Ω	.1Ω	0Ω	†2.7KΩ	†15KΩ	100Meg	330Ω
V38	6BY6	200Ω	100Ω	0Ω	.1Ω	†18KΩ	‡3.9KΩ	.6Ω		
V39	6BY6	140Ω	100Ω	0Ω	.1Ω	†8KΩ	‡3.9KΩ	.6Ω		
V40	6AN8	‡8KΩ	390KΩ	6.2KΩ	0Ω	.1Ω	†11KΩ	‡550Ω	1Meg	400Ω
V41	12BH7	†5.2KΩ	1.8Meg	450Ω	.1Ω	.1Ω	†11KΩ	700Ω	200Ω	0Ω
V42	12BH7	†5.2KΩ	1.8Meg	450Ω	.1Ω	.1Ω	†11KΩ	700Ω	200Ω	0Ω
V43	12BH7	†5.2KΩ	1.8Meg	450Ω	.1Ω	.1Ω	†11KΩ	3.5KΩ	200Ω	0Ω
V44	6BC7	†1Meg	†12KΩ	0Ω	0Ω	.1Ω	†17KΩ	†1Meg	†12KΩ	†1Meg
V45	19VP22	†20KΩ	†1Meg	†120KΩ	†10KΩ	†10KΩ	†1Meg	†120KΩ	NC	50Meg
		PIN 10 NC	PIN 11 †120KΩ	PIN 12 †1Meg	PIN 13 †10KΩ	PIN 14 †20KΩ				

*MEASURED IN "UHF" POSITION.
‡MEASURED FROM POSITIVE SIDE OF C2.
†MEASURED FROM POSITIVE SIDE OF C1.
▲MEASURED FROM PIN 3 OF V25.
NC-NO CONNECTION.
TP-TIE POINT.
ALL MEASUREMENTS TAKEN IN "VHF" POSITION UNLESS OTHERWISE DESIGNATED.

TUBE PLACEMENT CHART

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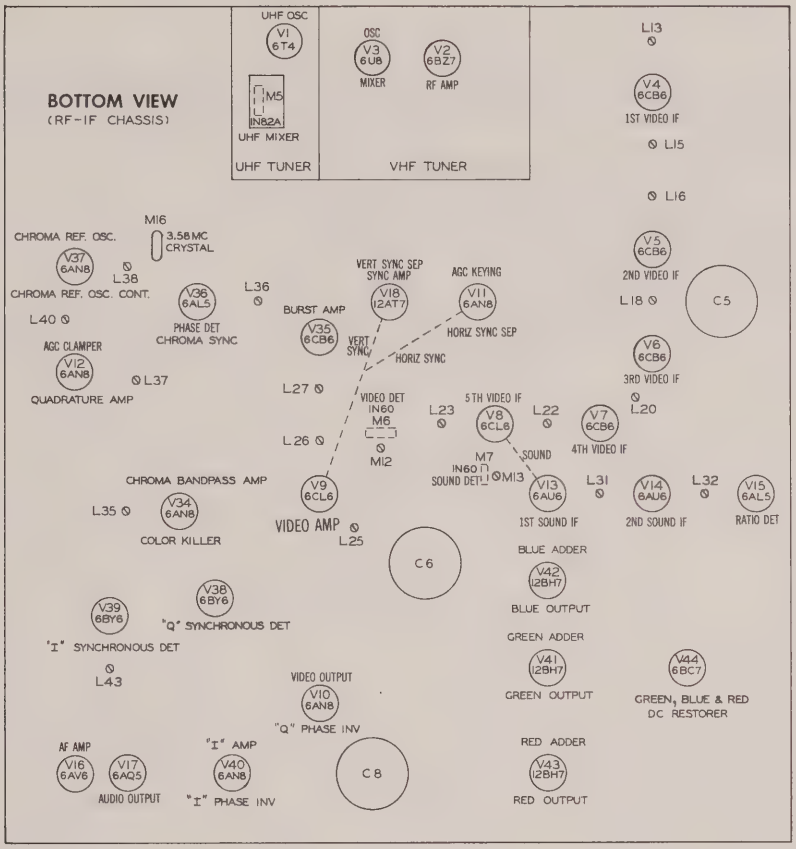

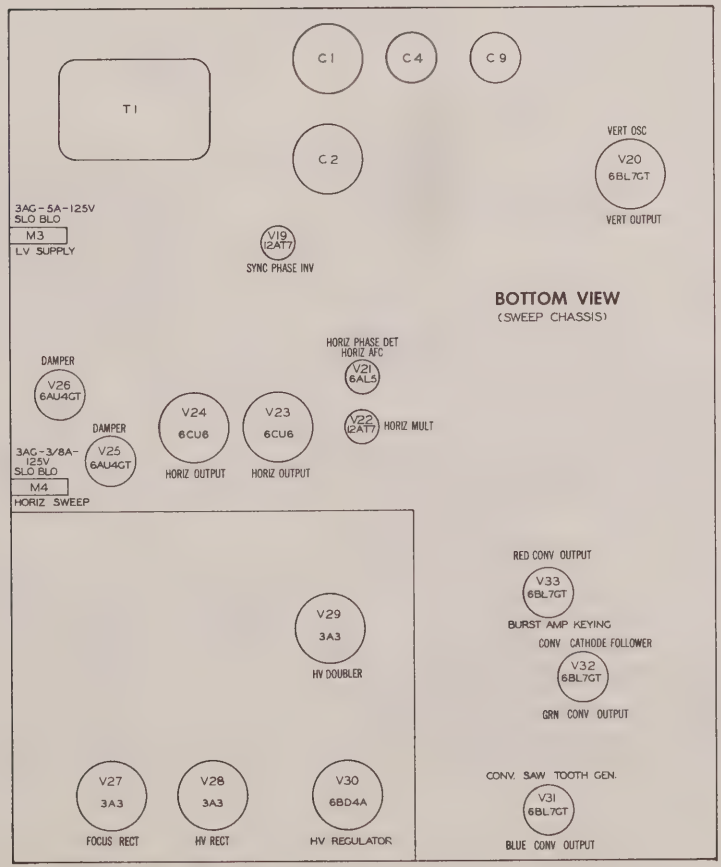

CBS-COLUMBIA MODELS 205C1, 205C2

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal multivibrator tube (V22). Remove the ground connection from pin 8 (cathode) of the horizontal output tubes (V23 and V34). Connect a 2000Ω, 10 watt resistor from pin 8 of V23 and V34 to chassis ground.
AC line voltage should be maintained at 117V.
Allow proper time for receiver and test equipment to warm-up.

VIDEO IF ALIGNMENT

Connect the negative lead of a 4 volt bias supply to the IF AGC line. Connect the positive lead to chassis.
Use only enough sweep and signal generator output for usable indication on scope and VTVM.
Leads between test equipment and chassis connections should be shielded and kept short as possible.
Set the channel selector between any two channels to reduce the possibility of erroneous indications.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope afor horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an un-grounded tube shield floating over converter tube (V3). Low side to chassis.	Not used	39.75MC (Unmod)	Between any two channels	Use VTVM. DC probe to point ⓐ Common to point ⓑ	A1	Attenuate signal generator output for not more than -3 volts at VTVM. Adjust for MINIMUM deflection.
2.	"	"	"	47.25MC	"	"	A3, A3	"
3.	"	"	"	41.25MC	"	"	A4	"
4.	"	"	"	41.25MC	"	"	R35	Detune slug adjustment (A5) by turning several turns counter clockwise. Adjust R35 for MINIMUM deflection.
5.	"	"	"	41.25MC (Unmod)	"	DC probe thru detector (Fig. 1) to pin 5 (Plate) of 6CB6 (V7). Common to chassis.	A5	Adjust for MINIMUM deflection.
6.	"	"	"	43.4MC 41.25MC (Unmod)	"	"	R34	Attenuate signal generator output for not more than -0.3 volts at VTVM with signal generator set at 43.4MC. Then set signal generator for 41.25MC. Do not change output of generator. Adjust R34 for exact reading as obtained on VTVM when generator was set for 43.4MC.
7.	"	High side to pin 2 (grid) of 6CL6 (V6). Low side to chassis.	44MC (10MC Swp)	41.7MC 45.75MC	"	Vert. Amp. to point ⓐ . Low side to chassis.	A6, A7	Use only enough sweep gmerator output for usable pattern on scope. Adjust for response curve similar to Fig. 2.
8.	"	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	"	41.7MC 45.0MC	"	"	A8, A9, A10	Adjust for flat-topped response similar to Fig. 3.
9.	"	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	"	41.7MC 45.75MC	"	Vert. Amp. to pin 5 (plate) of 6CB6 (V5), thru detector (Fig. 7) Low side to chassis.	A11, A12	Adjust for flat-topped response similar to Fig. 4.
10.	"	High side to an un-grounded tube shield floating over converter tube (V3). Low side to chassis.	"	41.7MC 45.75MC	"	"	A13, A14	Adjust for flat-topped response similar to Fig. 5.
11.	"	"	"	39.75MC 41.25MC 41.7MC 45.0MC 45.75MC 47.25MC	"	Vert. Amp. to point ⓐ . Low side to chassis.		Check for response curve similar to Fig. 6. If necessary, retouch A8, A9 and A10 to obtain correct response and marker positions. Repeat steps 5 and 6. Increase sweep generator output to observe 47.25MC, 41.25MC and 39.75MC trap markers. If necessary, repeat steps 1 thru 4. Remove 200Ω, 10 watt resistor from pin 8 of V23 and V34, and chassis. Reconnect pin 8 of V23 and V34 to chassis. Replace shield over converter tube. Remove bias supply.

SOUND IF ALIGNMENT

Remove the AGC keying tube (V11A) from its socket. Remove fuse (M4) (located on rear apron of deflection chassis.).
Set the channel selector between any two channels.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
13.	.001MFD	High side to point ⓐ . Low side to chassis.	4.5MC (Unmod)	Between any two channels	DC probe to point ⓐ . Common to chassis.	A15, A16, A17	Attenuate generator output for not more than -2 volts at VTVM. Adjust for maximum deflection.
13.	"	"	"	"	DC probe to pin 7 (plate) of 6AL5 (V16). Common to chassis.	A18	"
14.	"	"	"	"	DC probe to point ⓐ . Common to point ⓑ .	A19	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V11B in its socket. Replace M4 (fuse) in set.

VHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of the portion if not recommended in the field.

UHF TUNER ALIGNMENT

The UHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

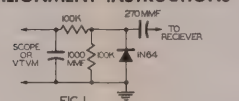


FIG. 1

FIG. 2

FIG. 3

FIG. 4

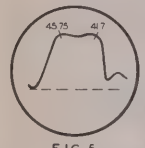


FIG. 5

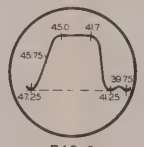


FIG. 6

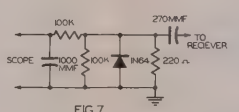


FIG. 7

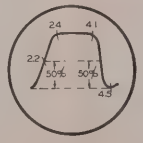


FIG. 8

BANDPASS AMPLIFIER ALIGNMENT

Remove fuse (M4) (located on rear apron of deflection chassis). Unless set has a color killer switch to open color killer circuit, connect the negative lead of a 30V bias supply to pin 2 (grid) of 6AS8 (V34D).
Connect the positive lead to chassis.
Turn the contrast control (R2) and the chroma control (R4A) fully clockwise.
If a separate marker generator is used, couple it loosely to pin 2 of V9.
Connect the synchronized sweep voltage from the sweep generator to horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	.005MFD	High side to pin 2 (grid) of 6CL6 (V9). Low side to chassis.	3MC (3MC Swp)	3.2MC 3.4MC 4.1MC 4.4MC 4.6MC	Between any two channels	Vert. Amp. thru detector (Fig. 7) to pin 2 (cathode) of 6BY8 (V38). Low side to chassis.	A30, A31, A32, A33	Adjust A30, A31, A32 and A33 for response curve similar to Fig. 8. Adjust A20 to place 4.5MC in trap notch. A33 affects high frequency side of response curve. A31 and A32 affects bandwidth and tilt.

3 DB BW: 3.6-2 KILOCYCLES

Connect a 500MMF mica capacitor between pin 6 (plate) of V12B and pin 2 (grid) of V9.
Leave bias connected as under "Bandpass Amplifier Alignment". Turn contrast control fully clockwise. Remove M4 from fuse holder.
Use only enough signal generator frequency for usable indication on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
16.	.005MFD	High side to pin 2 (grid) of 6CL6 (V9). Low side to chassis.	3.58MC (Unmod)	Between any two channels	DC probe thru detector (Fig. 7) to point ⓐ . Common to chassis.	A34	Adjust for MINIMUM deflection. Remove bias supply Replace M4 in fuse holder. Remove 500MMF from pin 6 of V12B and pin 2 of V9.

COLOR AFC ALIGNMENT

Tune in a local black and white TV station. Adjust contrast and brightness controls for a normal picture. Then preset hue range trimmer, chroma control and contrast control to their mid-range position.
Turn brightness control for low brightness. Connect a color bar generator across antenna terminals, set channel selector to receive color bars.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.			Not used	Not used	Between any two channels	Use VTVM. DC probe to pin 7 (plate) of 6AL5 (V36). Common to chassis.	A25	Adjust A25 counter clockwise until reading on VTVM drops to -2.5 volts. Then adjust clockwise until reading on VTVM rises sharply to -7 volts. Continue adjusting clockwise until reading passes thru maximum deflection and falls 2 volts below maximum reading on VTVM.
18.			"	"	"	"	A26	Adjust for maximum deflection.
19.			"	"	"	"	A27	Adjust for MINIMUM deflection.
20.	Direct	Use color bar generator. Connect across antenna terminals.			Channel of color bar generator.	"	A28, A29	Connect a clip lead from pin 8 of V12B to chassis. Adjust A28 and A29 for maximum deflection. Remove short from pin 8 of V12B.
21.	"	"			"		A30	Connect a clip lead from point ⓑ to chassis. Adjust A30 until color bars are almost in sync. Remove short point ⓐ . Color bars should fall in sync, if not retouch A30.
22.	"	"			"	DC probe to point ⓐ . Common to chassis.	R26	Connect a 10MMF capacitor across 3.58 crystal (M26). Adjust the color AFC balance control (R26) for zero reading on VTVM. Remove 10MMF capacitor from across M26.
23.	"	Use color bar generator. Connect across antenna terminals. Set generator for "Q" signal.			Channel of color bar generator "Q" Signal	Vert. Amp. to point ⓐ . Low side to chassis.	Hue Range Trimmer	Switch off the "I" channel of the color signal generator. Switch the "Q" channel to on position. Adjust hue range trimmer for zero "Q" indication on scope.
24.	"	Connect color bar generator across antenna terminals. Set generator for "I" signal.			Channel of color bar generator "I" signal	Vert. Amp. to point ⓐ . Low side to chassis.	A27	Switch off "Q" channel of color signal generator. Switch the "I" channel to on position. Readjust A27 for zero "I" indication on scope.

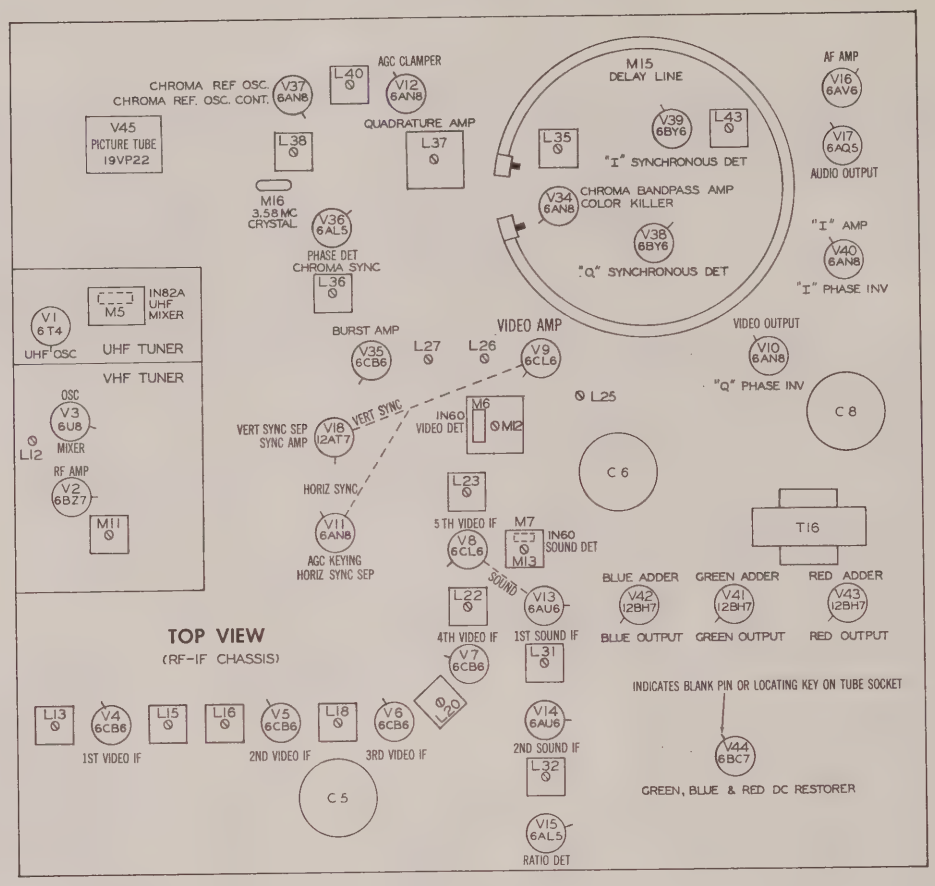
MATRIX ADJUSTMENT

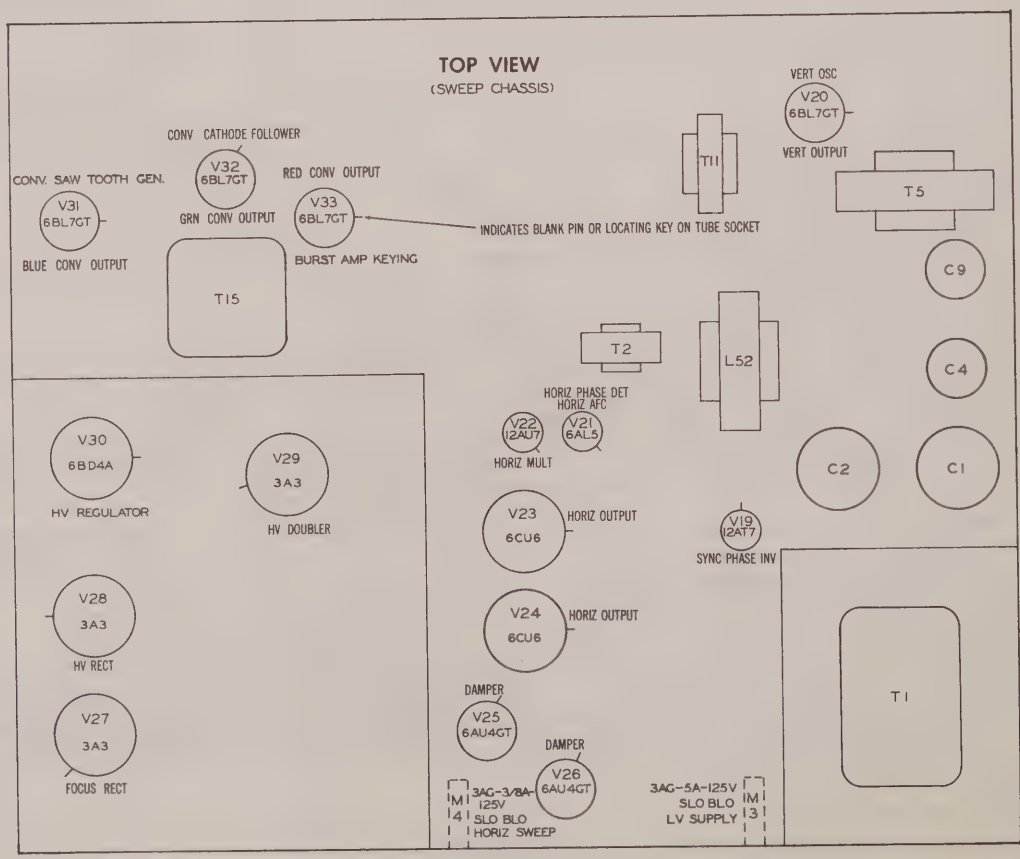
Connect a 100% saturated color bar generator to antenna terminals or tune in a station broadcasting on NTSC color bar signal. Set channel selector to receive color bars. Adjust contrast, hue range trimmer and chroma controls to their mid-range position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
25.	Direct	Use color bar generator Connect across antenna terminals.			Channel of color bar generator	Vert. Amp. to pin 13 (blue grid) of picture tube (V45). Low side to chassis.	R4A	Adjust the chroma control (R4A) for maximum cancellation of green and yellow bars.
26.	"	"				"	R37	Adjust the "I" gain control for best cancellation of red. Repeat steps 25 and 26 for best cancellation of green, yellow and red.
27.	"	"			"	Vert. Amp. to pin 2 (red grid) of picture tube (V45). Low side to chassis.		Check cancellation of green, blue and cyan bars.
28.	"	"				Vert. Amp. to pin 6 (green grid) of picture tube. Low side to chassis.		Check cancellation of red, magenta and blue bars. If necessary, repeat entire matrix adjustment until best overall cancellation is obtained.

CBS-COLUMBIA MODELS 205C1, 205C2

TUBE PLACEMENT CHART

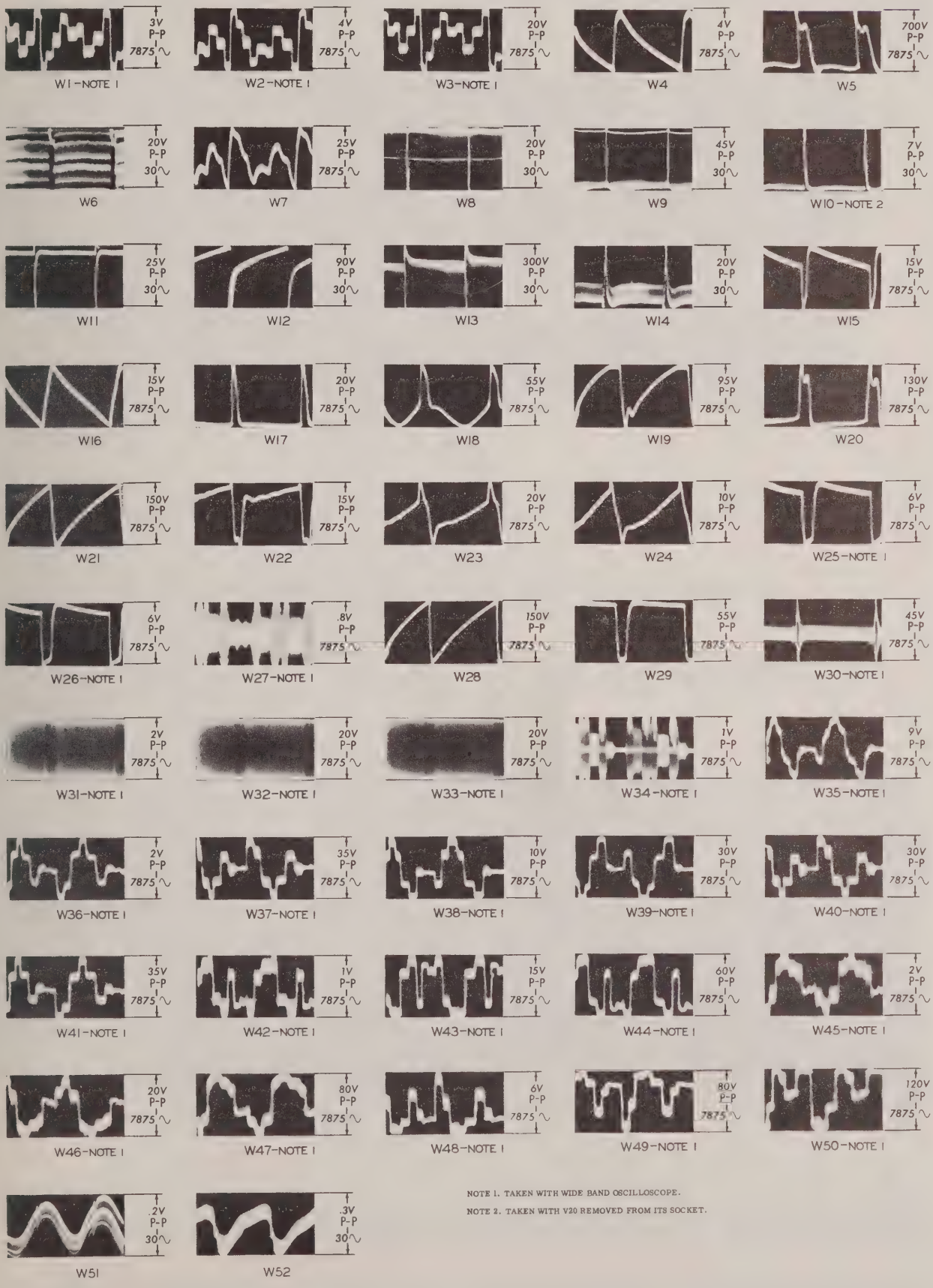




WAVEFORMS

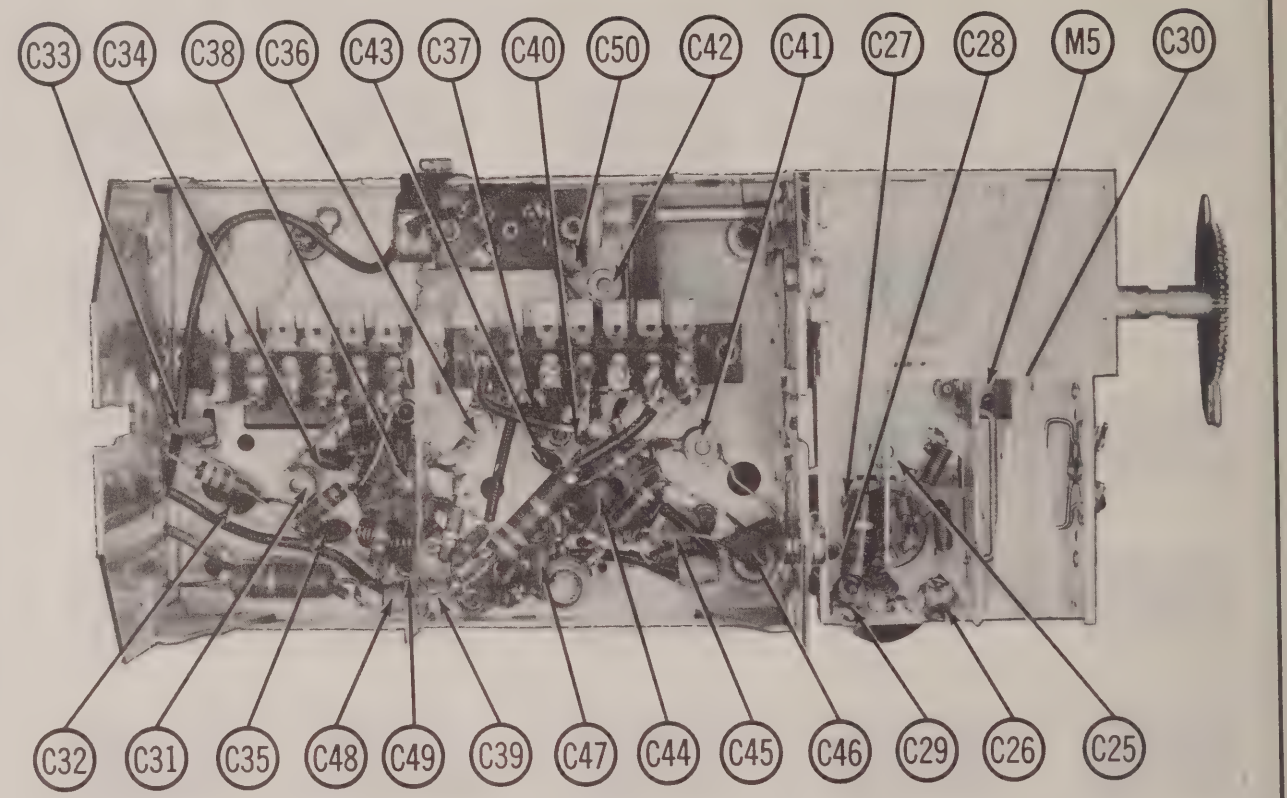
PROPERTY OF
L. F. BLANKENSHIP
3914 MEADE ST.
DENVER, COLORADO

ALL WAVEFORMS TAKEN WITH CONTRAST CONTROL (R2) SET AT MAXIMUM AND CHROMA CONTROL (R4) SET TO PRODUCE RED, YELLOW, GREEN, CYAN, BLUE, MAGENTA AND WHITE FROM NTSC COLOR-BAR GENERATOR

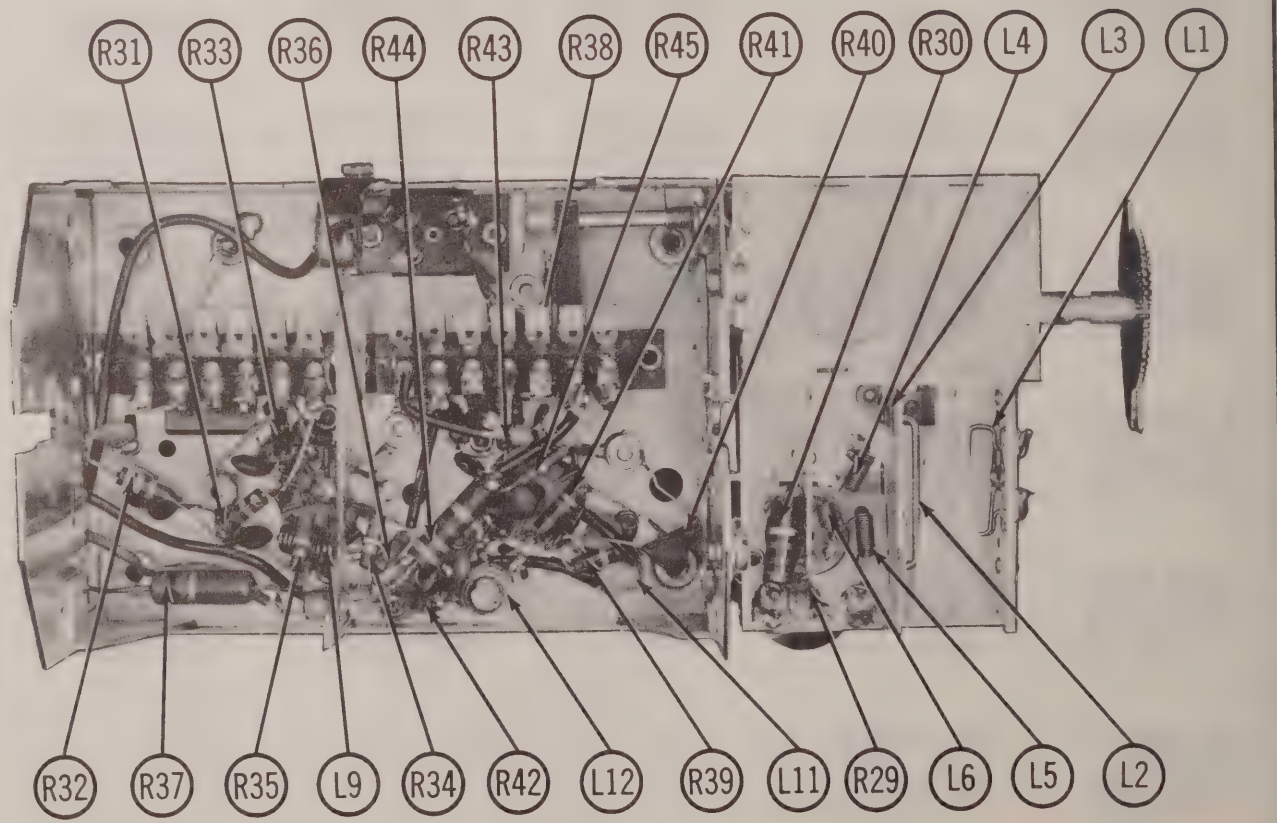


NOTE 1. TAKEN WITH WIDE BAND OSCILLOSCOPE.

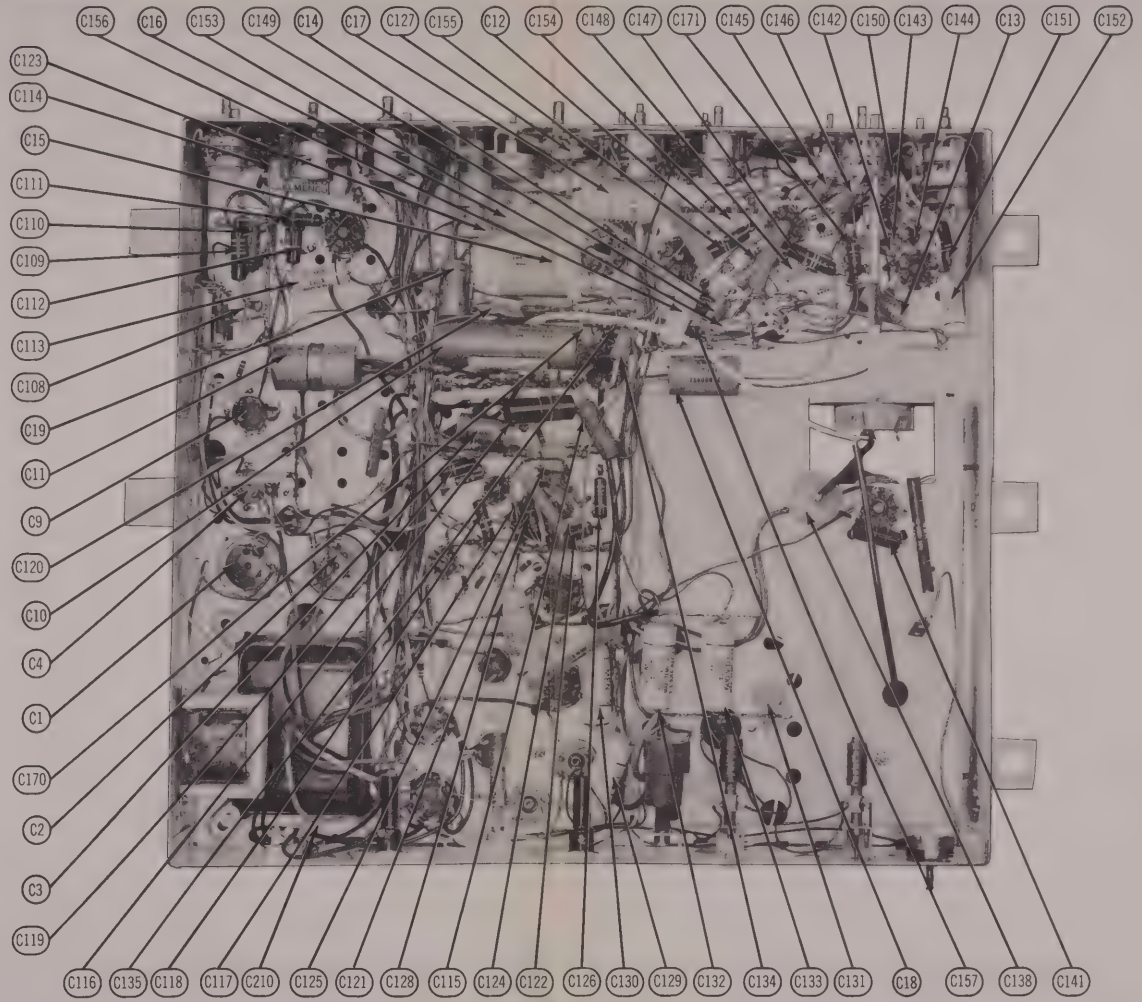
NOTE 2. TAKEN WITH V20 REMOVED FROM ITS SOCKET.



RF TUNER-BOTTOM VIEW-CAPACITOR IDENTIFICATION



RF TUNER-BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

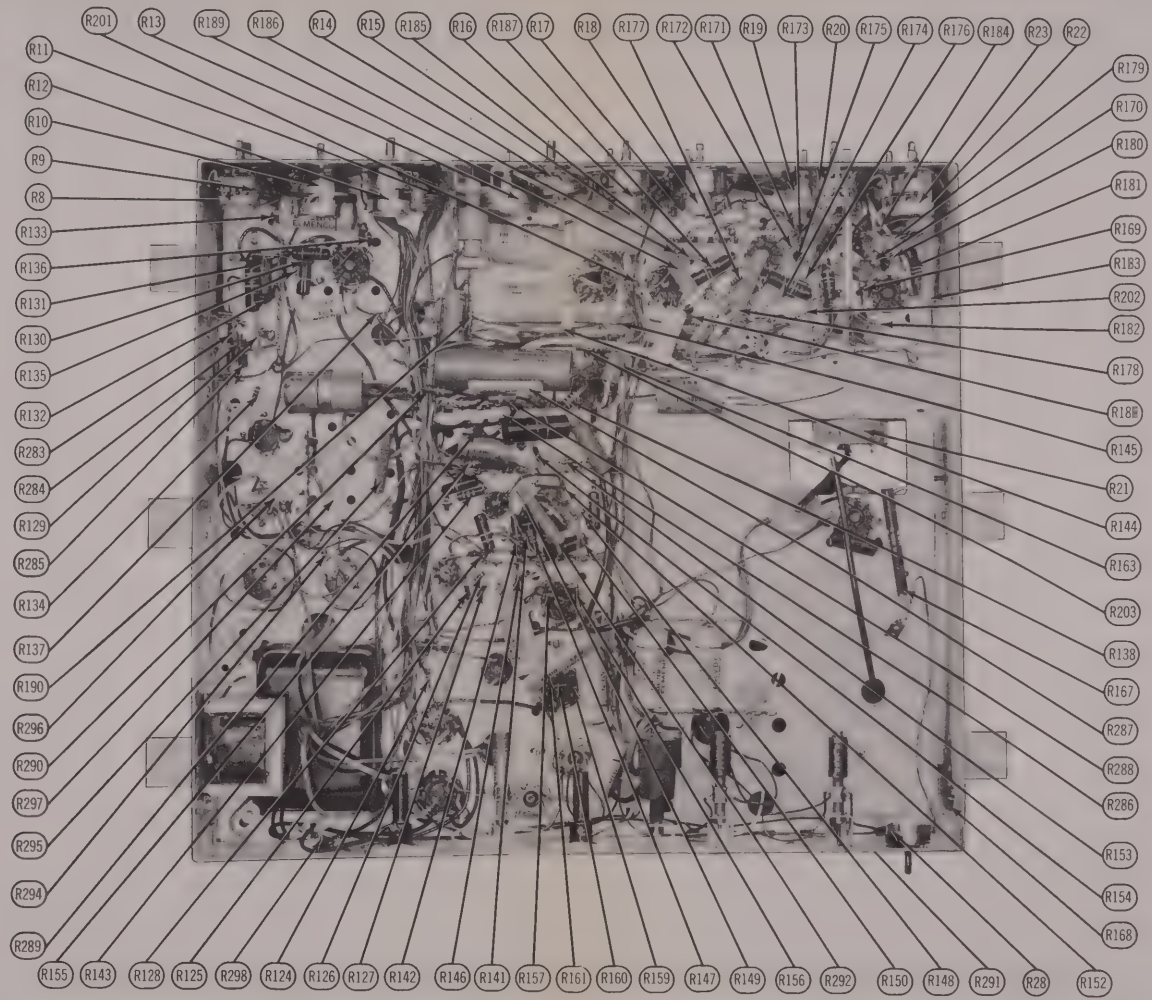


SWEEP CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION

PROPERTY OF
[illegible]SHIP
3924 MEADE ST.
DENVER, COLORADO

RF-IF CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION (R191-R293)

CBS-COLUMBIA MODELS 205C1, 205C2



SWEEP CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION

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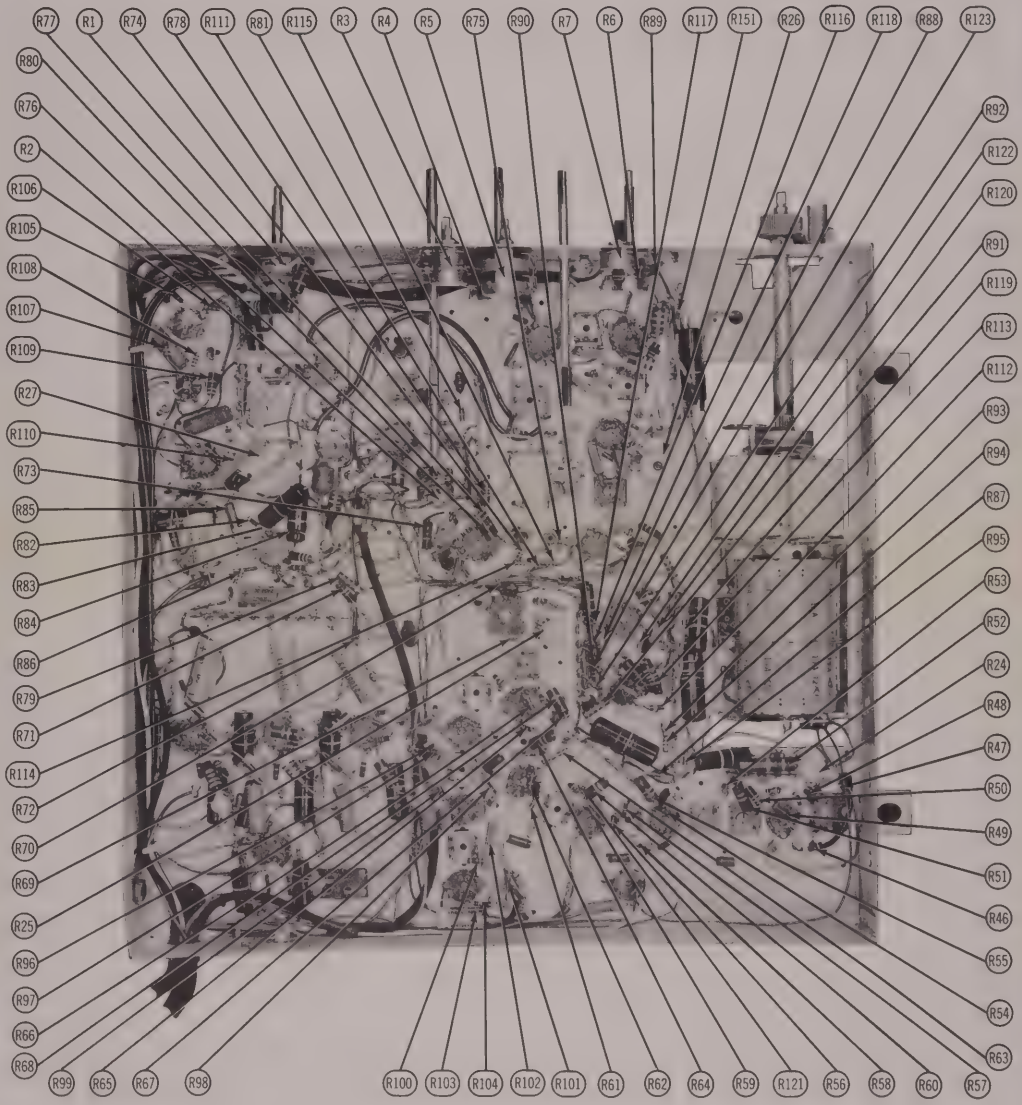
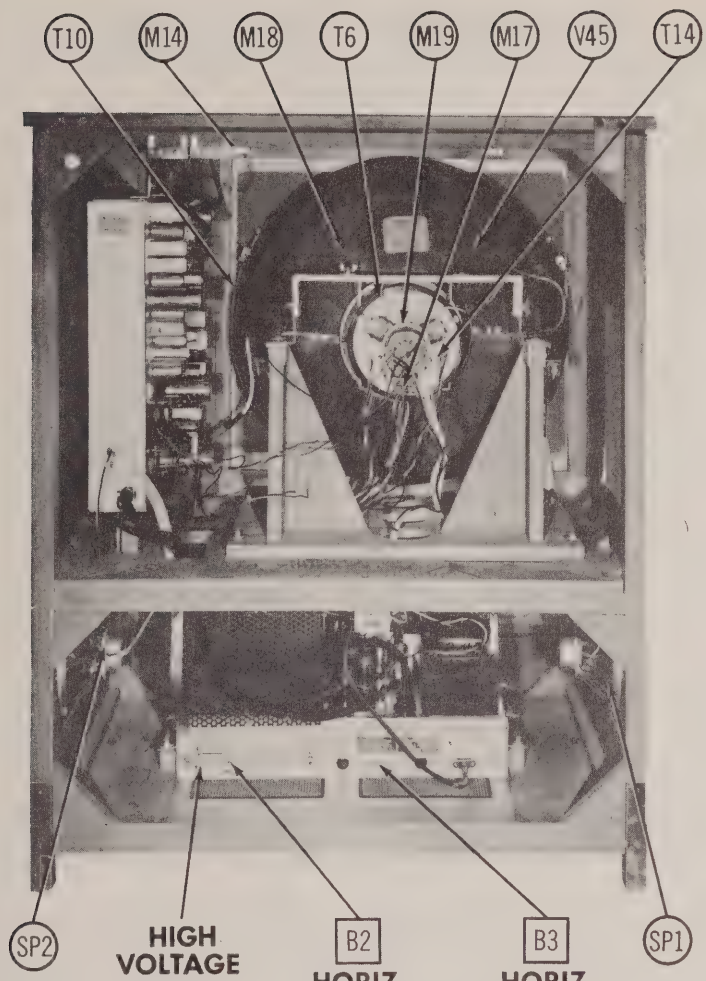
DENVER, COLORADO



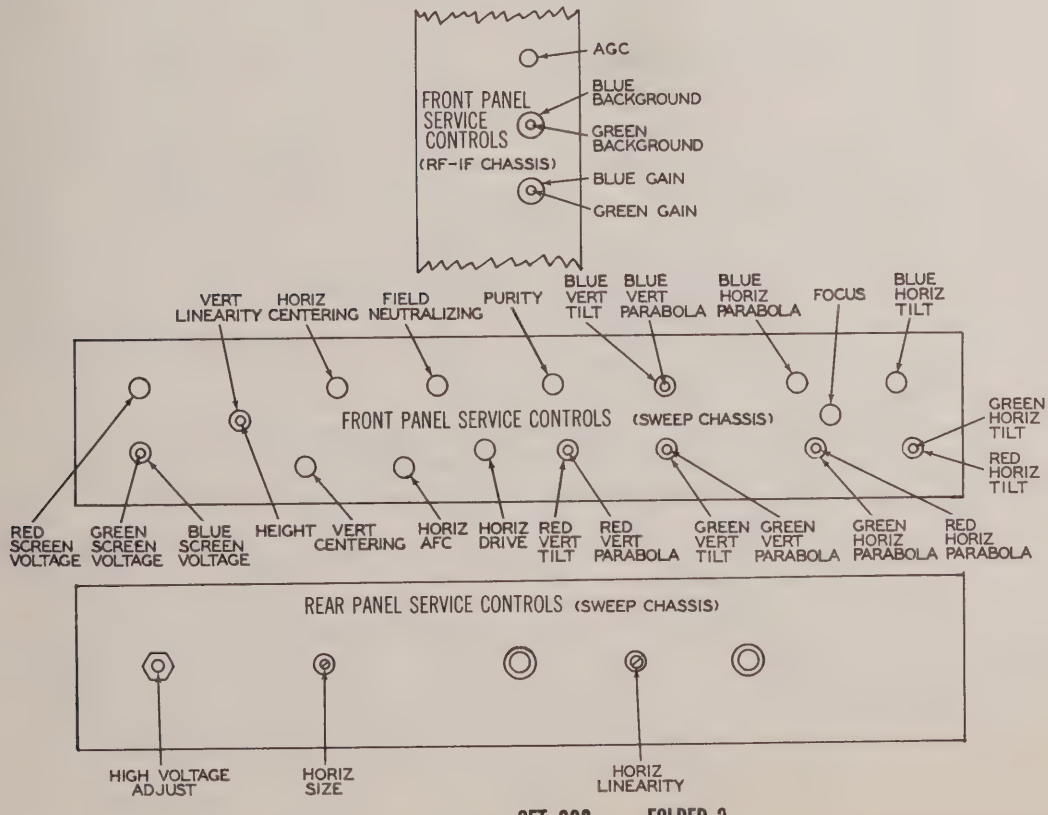
RF-IF CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION (R1-R151)

CBS-COLUMBIA MODELS 20SC1, 20SC2

PROPERTY OF
DENVER, COLORADO



CABINET—REAR VIEW



MISCELLANEOUS ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENT

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position and adjust the horizontal AFC slug (B1) until the picture synchronizes horizontally.

Turn the horizontal drive control (R14) as far clockwise as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

Turn AGC adjustment control (R7) to prevent any signal overload.

HIGH VOLTAGE ADJUSTMENT

Turn the contrast and brightness control fully counter clockwise. Connect the probe end of a high voltage probe to the high voltage anode lead (disconnect at picture tube and insert a "T" connector in the lead. Short out high voltage before disconnecting lead). Connect common lead of VTVM to chassis. Set meter for approximately 30KV reading on VTVM. Turn the high voltage adjustment control (R28) (rear panel of deflection chassis) for 26KV on VTVM. Turn the brightness control clockwise and notice the variation of high voltage on VTVM. There should not be more than 500 volts variation to the point where lose of regulation occurs. Beyond this point blooming will occur. The brightness control should always be operated within the range of the voltage regulator.

Disconnect power from the set, short out high voltage lead to chassis and remove VTVM. Reconnect high voltage anode lead.

COLOR PURITY ADJUSTMENTS

Connect a dot generator across antenna terminals. Turn the set on and adjust focus, contrast, brightness and fine tuning control for dots on picture tube. Turn the contrast and brightness controls at their lowest level with dots still visible on screen of picture tube.

Adjust the red, green and blue screen controls until the dots on the screen are all approximately the same size.

Adjust the red, green and blue static convergence magnets and the lateral blue beam positioning magnet (M17) to converge the red, green and blue dots near center of the screen. Remove dot generator.

Turn the field neutralizing control (R13) to its mid-range position. Loosen the two yoke positioning screws and slide yoke (T6A, T6B) back toward base of tube as far as possible without touching the convergence yoke assembly (T14A, T14B, T14C). Turn the contrast control, green and blue screen controls fully counter clockwise. Turn the red screen and brightness controls to maximum clockwise position. Adjust the two purity tabs of the purity magnet (M19) or rotate entire assembly of M19 for best red purity near the center of the screen. NOTE: In sets using a purity coil instead of a purity magnet rotate the purity coil around neck of tube and turn the purity control clockwise to increase the field strength.

Move the yoke forward (toward face of picture tube) until the best red purity is obtained on entire screen of the picture tube.

Tighten yoke assembly. The yoke should be perpendicular to the neck of the picture tube and spacing between inter-surface of the yoke and tube neck should be uniform. If necessary, retouch purity magnet (or coil) for best overall purity. Check the screen for any color contamination at edges of the screen. If necessary, adjust the field neutralizing control (R13) for minimum color contamination.

Turn the red screen control fully counter clockwise and the green screen control fully clockwise.

Check for an overall green screen with minimum color contamination.

Turn the green screen control fully counter clockwise and the blue screen control fully clockwise. Check for an overall blue screen with minimum color contamination on CRT.

If necessary, repeat purity adjustment for red purity and recheck green and blue screen for correct purity.

Turn the blue screen control fully counter clockwise and the red screen control clockwise until the picture tube screen begins to show red. Turn the green screen control clockwise, until the raster is a yellow color.

Then turn the blue screen control clockwise until the picture tube screen turns to a low-brightness white (neutral gray).

PARTS LIST AND DESCRIPTIONS
TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		CBS-Columbia PART No.	STANDARD REPLACEMENT		
V1	UHF Osc.	6T4	6T4	7DK	
V2	RF Amp.	6BZ7	6BZ7	9AJ	
V3	Osc.-Mixer	6U8	6U8	9AE	
V4	1st. Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V7	4th. Video IF Amp.	6CB6	6CB6	7CM	
V8	5th. Video IF Amp.	6CL6	6CL6	9BV	
V9	Video Amp.	6CL6	6CL6	9BV	
V10	Video Output-"Q" Phase Inv.	6AN8	6AN8	9DA	
V11	AGC Keying - Horiz. Sync Sep.	6AN8	6AN8	9DA	
V12	AGC Clamper-Quad Amp.	6AN8	6AN8	9DA	
V13	1st. Sound IF Amp.	6AU6	6AU6	7BK	
V14	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V15	Ratio Det.	6AL5	6AL5	6BT	
V16	AF Amplifier	6AV6	6AV6	7BT	
V17	Audio Output	6AQ5	6AQ5	7BZ	
V18	Vert. Syn Sep.-Sync Amp.	12AT7	12AT7	9A	
V19	Sync Phase Inv.	12AT7	12AT7	9A	
V20	Vert. Osc.-Vert. Output	6BL7GT	6BL7GT	8BD	
V21	Horiz. Phase Det.-Horiz. AFC	6AL5	6AL5	6BT	
V22	Horiz. Mult.	12AU7	12AU7	9A	
V23	Horiz. Output	6CU6	6CU6	6AM	
V24	Horiz. Output	6CU6	6CU6	6AM	
V25	Damper	6AU4GT	6AU4GT	4CG	
V26	Damper	6AU4GT	6AU4GT	4CG	Not used in some versions
V27	Focus Rect.	3A3	3A3	3C	
V28	HV Rectifier	3A3	3A3	3C	
V29	HV Doubler	3A3	3A3	3C	
V30	HV Regulator	6BD4A	6BD4A		
V31	Convergence Saw-tooth Generator - Blue Convergence Output	6BL7GT	6BL7GT	8BD	
V32	Convergence Cath. Follower-Green Convergence Output	6BL7GT	6BL7GT	8BD	
V33	Red Convergence Output-Burst Amp. Keying	6BL7GT	6BL7GT	8BD	
V34	Chroma Bandpass Amp.-Color Killer	6AN8	6AN8	9DA	
V35	Burst Amp.	6CB6	6CB6	7CM	
V36	Chroma Sync Phase Det.	6AL5	6AL5	6BT	
V37	Chroma Ref. Osc.-Chroma Ref. Osc. Control	6AN8	6AN8	9DA	
V38	"Q" Synchronous Detector	6BY6	6BY6	7CH	
V39	"I" Synchronous Detector	6BY6	6BY6	7CH	
V40	"I" Amp.-"I" Phase Inv.	6AN8	6AN8	9DA	
V41	Green Adder-Green Output	12BH7	12BH7	9A	
V42	Blue Adder-Blue Output	12BH7	12BH7	9A	
V43	Red Adder-Red Output	12BH7	12BH7	9A	
V44	Green DC Restorer- Blue DC Restorer- Red DC Restorer	6BC7	6BC7	9AX	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	CBS-Columbia PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V45	19VP22	19VP22				14W	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	CBS-Columbia PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	200	250	21000901			FP126			
C2	200	250	21000901			FP126			
C3	25	50	21000677			TC36	TD-25-50	FM-0525	
C4A	▲80	450	21000911				TM-8040-450	Q-325	
B	▲40	250					TD-40-250		
C	■40	250							
C5A	40	250	21000891			FP476	TM-4053	Q-060	
B	▲60	450				TC58	TD-40-250	FM-2540	
C	■10	450							
D	▲10	450							
C6A	▲500	25	21000871			FP334.6	TM-3132		
B	▲20	450							
C	■500	25							
C7	1	50	21000671			TC31	TD-1-50	MMT-0505	
C8A	▲40	450	21000881			FP436	TM-403020-450	Q-375	
B	50	25					TD-50-25		
C	■20	250							
D	▲20	450							

DENVER, COLORADO

PARTS LIST & DESCRIPTION (continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CBS-Columbia PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C9A	▲20	450	21000931			FP437	TM-4102	Q-395	
B	100	50							
C	▬20	450							
D	■20	450							
C10	1000	15	21000961			TC415	TD-1000-15NP	S-025	Note 1
C11A	30	50	21000921			TCT-3113	TDL-T30-150	FMT-1550	
B	30	50							
C	30	50							
C12	5	25	21000941			TC30	TD-5-25	MMT-0505	
C13	5	25	21000941			TC30	TD-5-25	MMT-0505	
C14	5	25	21000941			TC30	TD-5-25	MMT-0505	
C15	100	25	21000971			TC425	TD-100-25NP	MTH-2525 * MTH-2525	Note 1
C16	100	25	21000971			TC425	TD-100-25NP	MTH-2525 * MTH-2525	Note 1
C17	100	25	21000971			TC425	TD-100-25NP	MTH-2525 * MTH-2525	Note 1
C18	150	50	21000951			TC495	TD-150-50	MT-15150	
C19	25	50	21000677			TC36	TD-25-50	FM-0525	
C20	2	450	21000672			TC70	TD-2-450	FM-4504	
C21	2	450	21000672			TC70	TD-2-450	FM-4504	
C22	4	450	21000673			TC70	TD-4-450	FM-4504	
C23	4	450	21000673			TC70	TD-4-450	FM-4504	
C24	4	450	21000673			TC70	TD-4-450	FM-4504	
C25	2-5.5			829-6		CT552			
C26	1000								
C27	800			DD-801	831-801	DC-521			
C28	800			DD-801	831-801	DC-521			
C29	1000								
C30	33			TCN-33	N750K-330				
C31	.8-3.5								
C32	6.8			TCZ-6R8	NPOA-6R8	ZT-5568			
C33	800			DD-801	831-801	DC-521			
C34	150			DD-151	811-151	UC-5315			
C35	3.6			TCZ-3R3	NPOA-3R3	ZT-5533			
C36	.8-3.5								
C37	47			DD-470	831-470	UC-5447			
C38	1000								
C39	1000								
C40	47			MFT-50					
C41	.8-3.5								
C42	.8-3.5								
C43	470			DD-471	831-471	UC-5347			
C44	7.5								
C45	1000			DD-102	801-001	DC-521			
C46	220			DD-221	811-221	UC-5322			
C47	800			DD-801	831-801	DC-521			
C48	1000								
C49	1000								
C50	800			DD-801	831-801	DC-521			
C51	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C52	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C53	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C54	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C55	510		23065510	DD-501	811-501	UC-535		K-1351	
C56	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C57	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C58	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C59	510		23065510	DD-501	811-501	UC-535		K-1351	
C60	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C61	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C62	510		23065510	DD-501	811-501	UC-535		K-1351	
C63	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C64	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C65	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C66	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C67	510		23065510	DD-501	811-501	UC-535		K-1351	
C68	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C69	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C70	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C71	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C72	10000		23065920	DD-103	811-01	DC-511			
C73	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C74	270	500	20001370	TCZ-271	NP0-335-271	MCE241		KR-1347	
C75	33		23061170	TCZ-33	NP0L-330	ZT-5433		KR-1433	
C76	10000		23065920	DD-103	811-01	DC-511			
C77	.1	400	22017280	DF-104		PT401	IMP4-P1	330401	
C78	.0015	400	22017060	D6-152	GP2L-152	PT6215	IMP6-D15	3306215	
C79	5000		23065910	DD-502	811-005	DC-525		C-1250	
C80	.0033	400	22017100	D6-332	GP2-333-332	PT6233	IMP6-D33	3306233	
C81	.47	200	22016840			PT4047	IMP2-P47	3302047	
C82	.22	200	22016820			PT4022	IMP4-P22	3304022	
C83	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C84	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C85	.1	400	22017280	DF-104		PT401	IMP4-P1	330401	
C86	1.5		23000421	TCZ-1R5	NP0A-1R5	ZT-5515			
C87	5000		23065910	DD-502	811-005	DC-525		C-1250	
C88	5000		23065910	DD-502	811-005	DC-525		C-1250	
C89	1500		23064640	DD-152	801-0015	DC-5215		C-1215	
C90	68		23000110	D6-680	GP1K-680	UC-5468		K-1468	
C91	5000		23065910	DD-502	811-005	DC-525		C-1250	
C92	470		23064600	DD-471	831-471	UC-5347		K-1347	
C93	270		23001670	D6-271	GP2K-271	UC-5327		K-1327	
C94	1000		23000740	D6-102	GP2L-102	UC-521	IMP6-D1	K-1210	
C95	.047	200	22016740	DF-503		PT4147	IMP2-S47	3302147	
C96	.0047	400	22017120	D6-472	GP2-333-472	PT6247	IMP6-D47	3306247	
C97	.047	400	22017240	DF-503		PT4147	IMP4-S47	3304147	
C98	.1	200	22016780	DF-104		PT401	IMP2-P1	330201	
C99	330	500	20003960	D6-331	GP2K-331	UC-5333		K-1333	
C100	.01	400	22017160	D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C101	10000		23065920	DD-103	811-01	DC-511			Note 2
C102	.1	400	22017280	DF-104		PT401	IMP4-P1	330401	
C103	.01	400	23065920	D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C104	.001	400	22017040	D6-102	GP2L-102	PT621	IMP6-D1	330621	
C105	10000		23065920	DD-103	811-01	DC-511			
C106	270		23001670	D6-271	GP2K-271	UC-5327		K-1327	
C107	.047	400	22017240	DF-503		PT4147	IMP4-S47	3304147	
C108A	2000					DC-522	IMP6-D2	C-1220	
B	5000		♦82000121	♦PC-100	♦1405-01	DC-525	IMP6-D5	C-1250	
C	5000					DC-525	IMP6-D5	C-1250	

PARTS LIST & DESCRIPTION (continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CBS-Columbia PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C109	.0068	600	22008640						
C110	.001	600	22017540	D6-102	GP2L-102	PT621	IMP6-D1	330621	
C111	.0022	600	22017580	D6-222	GP2-333-222	PT6222	IMP6-D22	3306222	
C112	.033	400	22011720	DF-303		PT6133	IMP6-S3	3306133	
C113	.05	600	22017740	DF-503		PT615	IMP6-S5	330615	
C114	.22	600	22017820			PT6025	IMP6-P22	3306022	
C115	.05	600	22017240	DF-503		PT615	IMP6-S5	330615	
C116	.1	600	22017780	DF-104		PT601	IMP6-P1	330601	
C117	.001	400	22008040	D6-102	GP2L-102	PT621	IMP6-D1	330621	
C118	.001	400	22008040	D6-102	GP2L-102	PT621	IMP6-D1	330621	
C119	.015	200	22016680	DD16-153		PT6115	IMP6-S15	3306115	
C120	5000		23000631	DD-502	811-005	DC-525	IMP6-D5	C-1250	
C121	.0047	400	22016620	D6-472	GP2-333-472	PT6247	IMP6-D47	3306247	
C122	.047	200	22016740	DF-503		PT4147	IMP2-S47	3302147	
C123	3900	500	20012520			MCE463		CR-1239	
C124	510	500	20005120			MCE245		KR-1351	
C125	270	500	20003440	D6-271	NP0-335-271	MCE241		KR-1327	
C126	.0022	600	22017580	D6-222	GP2-333-222	PT6222	IMP6-D22	3306222	
C127	390	500	20003480	D6-391		MCB243		KR-1339	
C128	.22	600	22017820			PT6022	IMP6-P22	3306022	
C129	.22	600	22017820			PT6022	IMP6-P22	3306022	Note 3
C130	.22	600	22017820			PT6022	IMP6-P22	3306022	Note 3
C131	1000	2000	22000521	DD30-102	3KV-102	DC3021		C-3210	
C132	.22	600	22017820			PT6022	IMP6-P22	3306022	
C133	.22	600	22017820			PT6022	IMP6-P22	3306022	
C134	200	2000	20030800	DD30-201		MCL320		K-2320	
C135	200	2000	20030800	DD30-201		MCL320		K-2320	
C136	150	2000							
C137	1200	15000	23000151						
C138	1200	15000	28000151						
C139	1200	15000	23000181						
C140	2000	30000	23000161						
C141	.022	600		DF-203	817-203	PT6122	IMP6-S22	3306122	Note 4
C142	.005	600	22017620	D6-502	GP2-333-502	PT625	IMP6-D5	330625	
C143	820	500	29005170	D6-821	GP2K-821			K-1382	
C144	.012	600	22015170					3306112	
C145	470	500	20001900	D6-471	GP2K-471	MC245		K-1347	
C146	.01	600	22017660	D6-103	GP2-333-103	PT611	IMP6-S1	330611	
C147	.012	600	22015170						
C148	.05	600	22017740	DF-503		PT615	IMP6-S5	330615	
C149	390	500	20003480	D6-391		MCB243		KR-1339	
C150	.01	600	22017660	D6-103	GP2-333-103	PT611	IMP6-S1	330611	
C151	.012	600	22015170						
C152	.05	600	22017740	DF-503		PT615	IMP6-S5	330615	
C153	390	500	20003480	D6-391		MCB243		KR-1339	
C154	.01	600	22017660	D6-103	GP2-333-103	PT611	IMP6-S1	330611	
C155	.012	600	22015170						
C156	.05	600	22017740	DF-503		PT615	IMP6-S5	330615	
C157	390	500	20003480	D6-391		MCB243		KR-1339	
C158	470	500	20004000	D6-471	GP2K-471	MCB245		KR-1347	
C159	100	500	20003830	D6-101	GP1K-101	MCB235		KR-1310	
C160	10000		23065920	DD-103	811-01	DC-511			
C161	10000		23065920	DD-103	811-01	DC-511			
C162	33		23061170	TCZ-33	NP0L-330	ZT-5433		KR-1433	
C163	150	500	20003370	TCZ-151	NP0-334-151	MCB236		KR-1315	
C164	.0047	400	22016620	D6-472	GP2-333-472	PT6247	IMP6-D47	3306247	
C165	680			D6-681	GP2K-681	UC-5368		K-1368	
C166	10000		23065920	DD-103	811-01	DC-511			
C167	3		23030760	TCZ-3R3	NP0A-3R3	ZT-5533			
C168	10000		23065920	DD-103	811-01	DC-511			
C169	20000		23065930	DF-203	817-02				
C170	.05	600	22017740	DF-503		PT615	IMP6-S5	330615	
C171	.001	400	22014540	D6-102	GP2L-102	PT621	IMP6-D1	330621	
C172	2000	500	20013640			MCE457			
C173	2000	500	20013640			MCE457			
C174	10000		23065920	DD-103	811-01	DC-511			
C175	10000		23065920	DD-103	811-01	DC-511			
C176	.22	200	22016820			PT4022	IMP4-P22	3304022	
C177	2.2		23061050	TCZ-2R2	NP0A-2R2	ZT-5522			
C178	10000		23065920	DD-103	811-01	DC-511			
C179	10000		23065920	DD-103	811-01	DC-511			
C180	10000		23065920	DD-103	811-01	DC-511			
C181	10000		23065920	DD-103	811-01	DC-511			
C182	2.2		23061050	TCZ-2R2	NP0A-2R2	ZT-5522			
C183	10000		23065920	DD-103	811-01	DC-511			
C184	10000		23065920	DD-103	811-01	DC-511			
C185	10000		23065920	DD-103	811-01	DC-511			
C186	22		23061130	TCZ-22	NP0K-220	ZT-5422		KR-1422	
C187	.1	400	22017280	DF-104		PT401	IMP4-P1	330401	
C188	24		23060840	TCZ-24	NP0K-240			KR-1424	
C189	5		23061070	TCZ-4R7	NP0A-4R7	ZT-555		KR-1550	
C190	100		23005120	TCZ-100	NP0-337-101	ZT-531		KR-1310	
C191	.047	400	23017240	DF-503		PT4147	IMP4-S47	3304147	
C192	18		23060810	TCZ-18	NP0K-180			KR-1418	
C193	.1	400	22017280	DF-104		PT401	IMP4-P1	330401	
C194	10		23060780	TCZ-10	NP0K-100	ZT-541		KR-1410	
C195	.1	400	22017280	DF-104		PT401	IMP4-S47	330401	
C196	470	500	20004000	D6-471	GP2K-471	MC245		K-1347	
C197	.1	400	22017280	DF-104		PT401	IMP4-P1	330401	
C198	.047	400	22017240	DF-503		PT4147	IMP4-S47	3304147	
C199	.1	200	22016780	DF-104		PT401	IMP2-P1	330201	
C200	.1	400	22017280	DF-104		PT401	IMP4-P1	330401	
C201	470	500	20004000	D6-471	GP2K-471	MC245		K-1347	
C202	.1	400	22017280	DF-104		PT401	IMP4-P1	330401	
C203	.047	400	22017240	DF-503		PT4147	IMP4-S47	3304147	
C204	.1	200	22016780	DF-104		PT401	IMP2-P1	330201	
C205	.1	400	22017280	DF-104		PT401	IMP4-P1	330401	
C206	470	500	20004000	D6-471	GP2K-471	MC245		K-1347	
C207	.1	400	22017280	DF-104		PT401	IMP4-P1	330401	
C208	.047	400	22017240	DF-503		PT4147	IMP4-S47	3304147	
C209	.1	200	22016780	DF-104		PT401	IMP2-P1	330201	
C210A	10000	1000		DD-103					Note 5
B	10000	1000		DD-103					Note 5

Note 1. Non-polarized unit.
Note 2. Not used in some versions.
Note 3. Some versions use .047MFD in this application (Part No. 22017740).
Note 4. Some versions use .01MFD in this application (Part No. 22017660).
Note 5. Some versions use single units in this application (Part No. 23000511).
♦ Items C108A, C108B, C108C, R129A, R129B and R129C are combined in one unit.
* Connect negative terminals together.

PROPERTY OF
F. L. ANKENSHIP
392 MEADE ST.
DENVER, COLORADO

PROPERTY OF
F. BLANKENSHIP
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CBS-Columbia PART No	IRC PART No	CLAROSTAT PART No	CENTRALAB PART No	MALLORY PART No	INSTALLATION NOTES
R1A	1Meg	½	36001071	QJ-767 †		F1-52	UF15A	Tone - Panel
B	500KΩ	½				R2-41	UR35A } •	Volume - Rear
C	Switch					KS-1	UR-2S }	Attach to R1B
R2A	3000Ω	½	36001141	QU-112			UE301	Contrast
B	500Ω	½		MU-108				
R3A	10KΩ	½	36001243	QJ-158 ▲		F1-33	UE688	Blue Gain - Panel
B	10KΩ	½				R2-33		Green Gain - Rear
R4A	100Ω	½	36001131					Corona - Panel
B	7500Ω	½						Brightness -Rear-wirewound
R5A	15KΩ	½	36001242	QJ-769 ▲			UE900	Blue Background-Panel
B	15KΩ	½						Green Background-Rear
R6A	5000Ω	½	36001181	QJ-770 ■		F1-19	UF53L } •	Horiz. Hold - Panel
B	1Meg	½				R2-51	UH16L	Vert. Hold - Rear
R7A	250KΩ	½	36001091	QU-130	A47-250K-S	AB-50	SU-46	AGC
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8	25KΩ	3	36001313		43C1-25K			Red Screen - wirewound
R9A	25KΩ	3	36001247			F1-27	UE817W	Blue Screen - Panel
B	25KΩ	3				R2-21		Green Screen - Rear
R10A	5000Ω	3	36001246			F1-18	UE870W	Vert.Linearity-Panel-wirewound
B	2Meg	½				R2-67		Height-Rear
R11	40Ω	4	36000931				M40PK	Horiz.Centering-tapped ⑥ 20Ω-wirewound
B	20Ω	2	36001248				UE26W	Vert.Centering -Wirewound
B13	40Ω	4	36000931				M40PK	Field Neutralizing-wirewound tapped ⑥ 20Ω - Note 1
R14A	250KΩ	½	36001081	QU-130	A47-250K-S	AB-50	SU-46	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R14A
R15A	30Ω	2	36001251	W-30	A43-30		R30L	Purity - wirewound
B	Shaft		Not Req.	Not Req.	FKS-1/4		Not Req.	Attach to R15A
R16A	100Ω	2	36001241				UE29W	Red. Vert. Tilt-tapped ⑥ 50Ω-wirewound-Panel
B	2500Ω	½						Red Vert. Parabola-Rear
R17A	100Ω	2	36001241				UE29W	Blue Vert. Tilt-tapped ⑥ 50Ω-wirewound-Panel
B	2500Ω	½						Blue Vert. Parabola-Rear
R18A	100Ω	2	36001241				UE29W	Green Vert. Tilt-tapped ⑥ 50Ω-wirewound-Panel
B	2500Ω	½						Green Vert.Parabola-Rear
R19A	150KΩ	½	36001261	QU-128		AB-43		Blue Horiz.Parabola
B	Shaft		Not Req.	Not Req.		AK-1		Attach R19A
R20A	150KΩ	½	36001244	QJ-773 ••		F1-53	UE1350	Red. Horiz. Parabola-Panel
B	150KΩ	½				R2-38		Green Horiz. Parabola-Rear
R21	7Meg	2	36001171					Focus
R23	50KΩ	1	36001261			A-1B		Blue Horiz. Tilt
R23A	50KΩ	1	36001245			F1-39	UE978	Red Horiz. Tilt-Rear
B	50KΩ	½				F1-29		Green Horiz. Tilt-Rear
R24	500Ω	½	36001111					IF Sound Level
R25	500Ω	½	36001112					IF Sound Reject
R26A	250Ω	½	36001091	QU-130	A47-250K-S	AB-50	SU-46	Color AFC Balance
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R26A
R27	500Ω	½	36001111					"T" Cable
R28A	1.5Meg	½	36001181	QU-158	A47-1.5Meg-S	AB-742	U-158	High Voltage-Note 2
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R28A

Note 1. Some versions will use an alternate control part #36001241.
Note 2. Some versions will use an alternate control part #36001262.
• Universal Replacement (Mallory exact duplicate part #1E1658S).
•• Universal Replacement (Mallory exact duplicate part #UE544).
† CONCENTRIKIT EQUIVALENT: K-2 KIT, BASE ELEMENTS AND SHAFTS : B13-137, P1-109 (Panel)
B13-133, R1-126(Rear)
76-1 SWITCH)
▲ CONCENTRIKIT EQUIVALENT: K-5 KIT, BASE ELEMENTS AND SHAFTS: B1-1B, P9-01B (Panel)
B1-32B, R12-02B (Rear)
■ CONCENTRIKIT EQUIVALENT: K-5 KIT, BASE ELEMENTS AND SHAFTS: B1-1B, P9-01B (Panel)
B1-1B, R12-02B (Rear)
▲ CONCENTRIKIT EQUIVALENT: K-5 KIT, BASE ELEMENTS AND SHAFTS: B1-1B, P9-01B (Panel)
B1-1B, R12-02B (Rear)
■ CONCENTRIKIT EQUIVALENT: K-5 KIT, BASE ELEMENTS AND SHAFTS: B1-1B, P9-01B (Panel)
B1-1B, R12-02B (Rear)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CBS-Columbia PART No	IRC PART No.	NOTES
R29	820Ω	1			
R30	2300Ω	1		BTA-2300	
R31	22KΩ	½			
R32	47KΩ	½			
R33	15Ω	½		BTS-15	
R34	270KΩ	½			
R35	220KΩ	½		BTS-220K	
R36	150Ω	½		BTS-150	
R37	1000Ω	1		BTA-1000	
R38	15KΩ	½			
R39	100KΩ	½			
R40	100KΩ	½			
R41	10KΩ	½			
R42	1000Ω	1		BTS-1000	
R43	10KΩ	½			
R44	3300Ω	1		BTA-3300	
R45	150KΩ	½			
R46	5.6Ω	1	30541230		
R47	2.5KΩ	½	30581230		Note 1
R48	100Ω	1	30602230	BTS-100	
R49	6.8Ω 5%	½	30602130	BTS-6.8 5%	
R50	47KΩ	1	30473240		
R51	10KΩ	2	30603250	BTS-10K	
R52	1800Ω	3	30583250	BTS-1800	
R53	470Ω	3	30471230	BTS-470	
R54	6.8Ω 5%	2	30602130	BTS-6.8 5%	
R55	10KΩ	2	30603250	BTS-10K	
R56	22KΩ 5%	½	30223150	BTS-22K 5%	
R57	22KΩ 5%	½	30223130	BTS-27K 5%	Note 2
R58	2.7KΩ 5%	½	30273130	BTS-27K 5%	

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA CBS-Columbia PART No	IRC PART No.	NOTES
R59	62Ω 5%	½	30620130	BTS-62 5%	
R60	10KΩ	2	30102250	BTB-10K	
R61	18KΩ 5%	½	30183130		
R62	180Ω	2	30181230	BTS-180	
R63	100Ω	9	30102230	BTS-1000	
R64	10KΩ	2	30103250	BTB-10K	
R65	3900Ω 5%	½	30393130	BTS-3900 5%	
R66	180Ω	1	30181230	BTS-180	
R67	12KΩ	1	30123240		
R68	1000Ω	1	30102250	BTB-1000	
R69	470Ω	1	30331230	BTS-470	
R70	4700Ω 5%	½	30472130		
R71	220KΩ 5%	½	30224140	BTA-220K 5%	
R72	3300Ω 5%	½	30333130	BTS-3300 5%	
R73	220Ω	1	30222140	BTA-220	
R74	27KΩ	½	30273230	BTS-27K	
R75	10KΩ	2	30102230		
R76	68000Ω 5%	2	30683250	BTB-6800 5%	
R77	6800Ω 5%	2	30682150	BTB-6800 5%	
R78	2700Ω 5%	1	30272140	BTA-2700 5%	
R79	220Ω	1	30222240	BTA-2200	
R80	3300Ω 5%	½	30333150	BTS-3300	
R81	1200Ω 5%	½	30121150	BTS-1200 5%	
R83	2.2Meg	½	30225230		
R83	220Ω	1	30221230	BTS-220	
R84	100Ω	2	301 00230	BTS-100	
R85	22KΩ	2	30223250		
R86	22KΩ	2	30223330		
R87	4.7Meg 5%	½	30475130		Note 2
R88	3.9Meg	½	30395230	BTS-3.9Meg	

RESISTORS (cont)

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA CBS-Columbia PART No	IRC PART No.	NOTES
R89	220KΩ	½	30224230	BTS-220K	
R90	47KΩ	½	30473230	BTS-47K	
R91	2200Ω	½	30222240	BTA-2200	
R92	47KΩ	½	30473230	BTS-47K	
R93	820Ω	½	30821230	BTS-820	
R94	180KΩ 5%	½	30184130	BTS-180K 5%	
R95	560KΩ 5%	½	30564130	BTS-560K 5%	
R96	330Ω	½	30331230	BTS-330	
R97	1000Ω	1	30102230	BTS-1000	
R98	47KΩ	½	30473230		
R99	1000Ω	1	30102230	BTS-1000	
R100	47Ω	1	30470230	BTS-47	
R101	47KΩ	½	30473230	BTS-47K	
R102	1.2Ω	1	30000081		
R103	22KΩ 5%	½	30223130	BTS-22K 5%	
R104	33KΩ 5%	½	30333130	BTS-33K 5%	
R105	820Ω	½	30821230	BTS-820	
R106	5600Ω	1	30562230	BTS-5600	
R107	220KΩ	½	30224230	BTS-220K	
R108	470KΩ	½	30474130	BTS-470K	
R109	330Ω	½	30331240		
R110	1000Ω	5	31000074	PW7-1000	
R111	22KΩ	½	30223230		
R112	82KΩ	½	30823230		
R113	5600Ω	1	30562230		
R114	22KΩ	½	30223230		
R115	270KΩ	½	30274230		
R116	2.2Meg	½	30225230		
R117	820KΩ	½	30824230	BTS-820K	
R118	560KΩ	½	30564230	BTS-560K	
R119	47KΩ	½	30473230		
R120	33KΩ	½	30333230		
R121	1Meg	½	30105330		
R122	470Ω	½	30471240	BTS-470	
R123	5600Ω	1	30562240		
R124	1.2KΩ	½	30123230		
R125	1Meg	½	30105330		
R126	470Ω	1		BTS-470	Note 3
R127	8200Ω 5%	½	30821130	BTS-820 5%	
R128	8200 5%	½	30821130	BTS-820 5%	
R129A	22KΩ	1			
B	8200Ω	1	+83000121		Note 8
C	8200Ω	1			
R130	1Meg	½	30105330		
R131	1.2Meg	½	30565130		Note 4
R132	5.6Meg	½	30565230		
R133	1.8KΩ	½	30182230		
R134	4700Ω	½	30472230	BTS-4700	
R135	22KΩ	½	30223150		
R136	3.9Meg	½	30395330		
R137	560Ω	½	30561230	BTS-560	
R138	6800Ω	½	30682250		
R139	1000Ω	½	30102230		
R140	100Ω	½	30102230		
R141	100KΩ 5%	½	30104130		
R142	100KΩ 5%	½	30104130		
R143	2.7KΩ	2	30272240		
R144	27KΩ	2	30272250		
R145	27KΩ	3	30272350		
R146	4.7Meg	½	30475230		
R147	470KΩ	½	30474230		
R148	22000Ω 5%	½	30223130	BTS-2200 5%	
R149	68000Ω 5%	½	30683130		
R150	100KΩ 5%	½	30104230		
R151	680KΩ	½	30684230		
R152	150KΩ	½	30154230		
R153	82000Ω	½	30823230	BTS-8200	
R154	10KΩ	½			Note 5
R155	330KΩ	½	30334230		
R156	100Ω	½	30601230	BTS-100	
R157	68Ω	½	30680230	BTS-68	
R158	22Ω	½			
R159	100Ω	½	30101230	BTS-100	
R160	68Ω	½	30680230	BTS-68	
R161	82000Ω	15	31000055		
R162	22Ω	1	30220240		
R163	4.7KΩ	½	30472230		
R164	4.7Ω	½	30000071		
R165	4.7Ω	½	30000071		Note 6
R166	4.7Ω	½	30000071		
R167	470Meg	½	33000071		
R168	2.2Meg	½	30225230		
R169	100KΩ	½	30104330		
R170	120KΩ	2	30124250		
R171	33KΩ	½	30103230		
R172	33000Ω	½	30332230	BTS-3300	
R173	33KΩ	½	30333230		
R174	47KΩ	½	30473230		
R175	47KΩ	½	30473230		
R176	180KΩ	½	30184230		
R177	2200Ω	½	30222230	BTS-2200	
R178	27KΩ	10			
R179	47KΩ	½	30473230		
R180	47KΩ	½	30473230		
R181	150KΩ	½	30154230		
R182	2200Ω	½	30222230	BTS-2200	
R183	27KΩ	10			
R184	10000Ω	½	30102330	BTS-1000	
R185	47KΩ	½	30473230		
R186	47KΩ	½	30473230		
R187	150KΩ	½	30154230		
R188	2200Ω	½	30222230	BTS-2200	
R189	27KΩ	10			
R190	560Ω	½	30561230	BTS-560	
R191	100Meg	½	30000751		
R192	10KΩ	½			

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CBS-Columbia PART No	IRC PART No.	NOTES
R193	4700Ω	½	30154230		
R194	150Ω	½	30151230	BTS-150	
R195	18KΩ	½	30183230		
R196	1000Ω	½	30102230	BTS-1000	
R197	47Ω	½		BTS-47	Note 7
R198	10KΩ	½			
R199	27KΩ	½		BTA-27K	
R200	3300Ω	½	30332230	BTS-3300	
R201	100KΩ	½	30104230		
R202	47KΩ	½	30473230		
R203	2700Ω	½	30272230	BTA-2700	
R204	15KΩ	½	30153230		
R205	1Meg 5%	½	30105130		
R206	1Meg 5%	½	30105130		
R207	3.9Meg	½	30395230		
R208	1.2Ω	½	30000081		
R209	10KΩ	½	30103230		
R210	15KΩ	½	30153230		
R211	1000Ω	½	30102230	BTS-1000	
R213	330Ω	½	30331230	BTS-330	
R213	18KΩ	2	30183240	BTA-18K	
R214	27KΩ	2	30273250		
R215	2200Ω	½	30222230	BTS-2200	
R216	150KΩ	½	30154230		
R217	39KΩ	2	30393250		
R218	220Ω	½	30221230	BTS-220	
R219	2200Ω	½	30222230	BTS-2200	
R220	56Ω	½	30560230	BTS-56	
R221	100Ω	½	30101230	BTS-100	
R222	33000Ω	5	31000493	PW7-3300	
R223	18KΩ 5%	2	30183150	BTS-18K 5%	
R224	6.8Meg	½	30685230	BTS-6.8Meg	
R225	390KΩ	½	30394230	BTS-390K	
R226	3900Ω 5%	½	30392130	BTS-3900 5%	
R227	33KΩ 5%	1	30333140	BTA-33K 5%	
R228	100Ω	½	30101230	BTS-100	
R229	4700Ω 5%	½	30472130		
R230	5000Ω	5	31000492	PW7-5000	
R231	4700Ω 5%	½	30472130	BTS-4700 5%	
R232	82000Ω	½	30823230		
R233	1Meg	½	30105330		
R234	56Ω	½		BTS-62	Note 8
R235	4700Ω 5%	1	30472140	BTA-4700 5%	
R236	3.3Meg	½	30333230		
R237	390KΩ	½	30394230		
R238	82000Ω 5%	½	30823150		
R239	10KΩ 5%	½	30103150		
R240	10KΩ 5%	½	30103130		
R241	47KΩ 5%	½	30473130		
R242	10KΩ 5%	½	30103150		
R243	680Ω	½	30681230		
R244	33000Ω 5%	½	30333130	BTS-3300 5%	
R245	10KΩ 5%	½	30103150		
R246	1.8Meg	½	30185230		
R247	27000Ω 5%	½	30273150	BTS-270 5%	
R248	1800Ω 5%	½	30181130	BTS-180 5%	
R249	47000Ω 5%	½	30473150		
R250	15KΩ	½	30153230		
R251	100KΩ	½	30104230		
R252	1Meg	½	30105230		
R253	10KΩ 5%	½	30103150		
R254	10KΩ 5%	½	30103130		
R255	10KΩ 5%	½	30103150		
R256	680Ω	½	30681230	BTS-680	
R257	3300Ω 5%	½	30332130	BTS-3300 5%	
R258	10KΩ 5%	½	30103150		
R259	1.8Meg	½	30185230		
R260	27000 5%	½	30273150	BTS-270 5%	
R261	1800 5%	½	30181130	BTS-180 5%	
R262	47000 5%	½	30473150		
R263	15KΩ	½	30153230		
R264	100KΩ	½	30104230		
R265	1Meg	½	30105230		
R266	10KΩ 5%	½	30103150		
R267	10KΩ 5%	½	30103130		
R268	10KΩ 5%	½	30103150		
R269	33000 5%	½	30332130	BTS-3300 5%	
R270	1200 5%	½	30121140	BTA-120 5%	
R271	820 5%	½	30820150	BTS-82 5%	
R272	10KΩ 5%	½	30103150		
R273	1.8Meg	½	30185230		
R274	2700 5%	½	30271130	BTS-270 5%	
R275	1800 5%	½	30181130	BTS-180 5%	
R276	47000 5%	½	30472150		
R277	15KΩ	½	30153230		
R278	100KΩ	½	30104230		
R279	1Meg	½	30105230		
R280	12KΩ	½	30123240	BTA-12K	
R281	12KΩ	½	30123230	BTS-12K	
R282	12KΩ	½	30123330	BTS-12K	
R283	100KΩ	½			Note 7
R284	100KΩ	½			Note 7
R285	10KΩ	½			Note 7
R286	5000Ω	5	31000492	PW7-5000	
R287	3300Ω	5	31000493	PW7-3300	
R288	22KΩ	½		BTA-22K	Note 7
R289	12KΩ	½	30123240	BTA-12K	
R290	10KΩ	½		BTA-10K	Note 7
R291	33Ω	40	31000451		
R292	75Ω	10	31000499	1 3/4A-75	
R293	220Ω	1	31000497		
R294	10KΩ	½	30103230	BTS-10K	
R295	10Ω	10	31000498	1 3/4A-10	
R296	330Ω	5	31000495		
R297	2Ω	20	31000431		
R298	220KΩ	2	30224250	BTS-220K	

TRANSFORMER (POWER)

ITEM No	RATING	REPLACEMENT DATA CBS-Columbia PART No	Hallerdson PART No	Merit PART No	RCA TYPE No	Stancor PART No	Thordarson PART No	Triad PART No
T1	PRI: SEC 1: 117VAC ⑨ 4.79A; SEC 2: 6.3VAC ⑨ 8A; SEC 3: 12.6VCT ⑨ 5.2A; SEC 4: 12.6VCT ⑨ 5.2A; SEC 5:	10000581						

TRANSFORMER (FILAMENT)

ITEM No	RATING PRI.	SEC. 1	SEC. 2	SEC. 3	CBS-Columbia PART No	Hallerdson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	117VAC	6.3VAC ⑨ 12A	⑨ 1.66A		10000831 ③	F5512 ①	P-2945 ① ②	P-6466 ① ③	21F10 ① ②	F-16X ① ②

① Tape 6.3VCT
② Drill one new mounting hole.
③ Not used in some versions.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	CBS-Columbia PART No	Hallerdson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T3	Vert.Osc. Trans.	12000971	B6701	A-4003	208T9	V402	A-8122	26A03 ①	A-97Y
T4	Horiz.Output Trans.	12001001							
T5	Vert.Output Trans.	12000981			243T1 ①	V307	A-8144		
T6A	Yoke-Horiz. (12MM)	16001241			233D1				
B	Vert.(60MM)								
T7	Horiz. Lin.Coil (25.5-30MM)	16001251	RF500 ④ ⑤	MWC-3 ⑤	206R1	20M4	WC-7	WC-23	WC-12 ⑤
	(28.5-34MM)	16002271	RF600 ④ ⑥	MWC-5 ⑤	21M1	20M15	WC-8	WC-22	WC-12 ⑤
T8	Width Coil(0.5-10MM)	16001241 ⑦							
T9	Purity Coil								
T10	Field Neutralizing Coil	16001261							
T11	Vert. Centering Choke	12000991							
T12	Horiz. Yoke Isolation Coil	16001231							
T13	Horiz. Yoke Isolation Coil	16001221	RF800 ⑤ ⑦ ⑧	MWC-11 ⑦	212R1 ⑦	20M16 ⑦	WC-5 ⑤ ⑦	WC-18 ⑤ ⑦	WC-12 ⑤ ⑦
T14A	Green Dynamic Con-								
B	Blue vergence yoke	16001311							
C	Red assembly								
T15	Dynamic Convergence Inductor Assy.	16001341							

① Drill new mounting hole(s).
② Use 9 to 1 turns ratio.
③ Enlarge mounting hole.
④ Connect to terminals #3 or #4 and "CT".
⑤ Connect to coded green and red terminals.
⑥ Connect to terminals #3 and #4.
⑦ Connect to coded red and blue terminals.
⑧ Not used in all versions.
⑨ Adjust to maximum inductance.
⑩ Connect to terminals #1 and #2.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI	SEC	CBS-Columbia PART No	Hallerdson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T16	5-4Ω	3Ω 7Ω	10000231	Z1002	A-3019	A-3849	22S58 ①	S-52	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	CBS-Columbia PART No	QUAM PART No	NOTES
SP1	6" x 9"	PM	3.6Ω	73000261	6AA3	
SP2	6" x 9"	PM	3.4Ω	73000271	6AA3	

COILS (RF-IF)

ITEM No	USE	DC RES PRI	DC RES SEC	CBS-Columbia PART No	MEISSNER PART No	MERIT PART No	MILLER PART No	NOTES
L1	UHF Ant. Coil	90CT						
L2	UHF RF Coil	0Ω						
L3	UHF Osc. Coupling Coil	0Ω						
L4	Fil. Choke	0Ω						
L5	Fil. Choke	0Ω						
L6	Cathode Choke	0Ω						
L7	UHF IF Output	0Ω						Tapped

PARTS LIST & DESCRIPTION (continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CBS-Columbia PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L8A	VHF Ant. Coils	0ΩCT	0Ω					Channels 2-13
B	UHF IF Strip							
L9	Neut. Coil	0Ω						
L10A	VHF RF, Mixer Grid, Osc. Coils	0Ω						Channels 2-13
B	UHF IF Strip	0Ω						
L11	Fil. Choke	0Ω						
L12	Conv. Plate	.1Ω	0Ω					
L13	1st Video IF Grid	.1Ω		12000851				Includes Caps., 41.25MC Trap, & Coupling Coil (Pri. 0Ω Sec. .4Ω)
L14	Fil. Choke	0Ω		15000511	19-1001		4604	1.7 Microhenries
L15	1st Video IF Plate	.1Ω		12000861				Includes Resistor, caps. & 39.75 Microhenries Trap
L16	2nd Video IF Grid	.1Ω		12000871				Includes cap., & 47.25 MC trap
L17	Fil. Choke	0Ω		15000511	19-1001		4604	1.7 microhenries
L18	3rd Video IF	.3Ω	.3Ω	12000901	17-5004	TV-125	6234	
L19	Fil. Choke	0Ω		15000511	19-1001		4604	1.7 microhenries
L20	4th Video IF	.2Ω	.2Ω	12000901	17-5004	TV-125	6234	
L21	Fil. Choke	0Ω		15000511	19-1001		4604	1.7 microhenries
L22	5th Video IF	.2Ω	.2Ω	12000911	17-5004	TV-125	6234	
L23	6th Video IF	.1Ω		12000891	17-4521*	TV-128■	6218*	Includes 47.25 MC trap.
L24	Shunt Peaking Coil	7Ω		16000051	19-3250	TV-185	6181	250 microhenries
L25	4.5MC Trap	.4ΩCT		15000631	17-3402▲		1469	
L26	Burst Amp. Primary	3Ω		15000621	17-6016			
L27	Burst Amp. Secondary	3Ω		15000621	17-6017			
L28	Shunt Peaking Coil	7Ω		16000051	19-3250	TV-185	6181	250 microhenries
L29	Series Peaking Coil	3.5Ω		16000524	19-3036	TV-180	6176	36 microhenries
L30	Series Peaking Coil	7Ω		16000051	19-3250	TV-185	6181	250 microhenries
L31	2nd Sound IF	8.3Ω	4.4Ω	12000931	17-3495	TV-113	6203	
L32	Ratio Det.	5.8Ω	2.5Ω	12000201	17-3497	TV-115	6205	Tertiary Winding=.5Ω
L33	Horiz. Osc.	63Ω		16000111	17-1576	TV-163	6210	
L34	Band Pass Amp. Plate Coil	7.8Ω*	4.6Ω	12000921	17-6010			*Tapped ⓐ 2.6Ω
L35	Band Pass Amp. Output Coil	1.5Ω		16000211	17-6011			
L36	Burst Amp. Plate Trans.	2.4Ω	1.4ΩCT	12000951	17-6012			
L37	Phase Det. Amp. Trans.	5.8Ω		12000961				"T" Winding=.4Ω "Q" Winding=.4Ω
L38	Series Peaking Coil	2.4Ω		16000521	19-6022		6152	20 microhenries
L39	Chroma Reference Osc. Plate Coil	4.4Ω		16001221	17-6015			Includes Caps.
L40	Chroma Reference Osc. Coil	1.5Ω		16001231	17-6013			Tapped ⓐ .85Ω
L41	Series Peaking Coil	123Ω		15000611	19-5102		4670	6.7 Millihenries
L42	Shunt Peaking Coil	26Ω		15000531	19-5101		4664	1.9 Millihenries
L43	"T"Band Pass Amp.	34ΩCT		15000601				
L44	Series Peaking Coil	30Ω		15000541			4652	1 Millihenry
L45	Series Peaking Coil	30Ω		15000541			4652	1 Millihenry
L46	Shunt Peaking Coil	7.5Ω		16000051	19-3250	TV-185	6181	250 Microhenries
L47	Series Peaking Coil	5.5Ω		16000522	19-3125		6153	130 Microhenries
L48	Shunt Peaking Coil	7.5Ω		16000051	19-3250	TV-185	6181	250 Microhenries
L49	Series Peaking Coil	5.5Ω		16000522	19-3125		6153	130 Microhenries
L50	Shunt Peaking Coil	7.5Ω		16000051	19-3250	TV-185	6181	250 Microhenries
L51	Series Peaking Coil	5.5Ω		16000522	19-3125		6153	130 Microhenries

*Use one winding only.
■Use adaptor plate.
▲Do not use external cap.

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: CBS-Columbia PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L52	.670ADC	12.8Ω	.7HY	16001291			•		
L53	.074ADC	204Ω	4.85HY	16001301	C-5015		C-1355①	20C65①	C-8X

① Drill new mounting holes.

PARTS LIST & DESCRIPTION (continued)

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA CBS-Columbia PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.600ADC	62000051	1229A	9RS-650MSL				
M2	.600ADC	62000051	1229A	9RS-650MSL				

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA CBS-Columbia PART No. FUSE	CBS-Columbia PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M3	3AG S/B	5A 125V	43000080		313005 (3AG S/B 5A)	341001	MDX5	HKP
M4	3AG S/B	3/8A 125V	43000090		313.375 (3AG S/B 3/8A)	341001	MDL 3/8	HKP

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA CBS-Columbia PART No.	SYLVANIA PART No.	NOTES
M5	1N82A		1N82A	UHF Mixer
M6	1N60		1N60	Video Det.
M7	1N60		1N60	Sound Det.

MISCELLANEOUS

ITEM No.	PART NAME	CBS-Columbia PART No.	NOTES
M8	Dial Light	64000111	#51
M9	Pilot Light	64000111	#51
M10	Tuner	69000621	VHF-UHF
M11	Trap	83A64917	VHF Ant. Input Filter
M12	Video Det. Assy.	12000881	Includes M6, coils and capacitors
M13	Sound Det. Assy.	12000941	Includes M7, coils and capacitors
M14	Switch	40000281	Micro (on-off-power)
M15	Delay Line	16000801	Luminance Channel
M16	Crystal	63000061	3.579545KC Osc.
M17	Magnet	19000221	Lateral blue beam positioning
M18	Magnetic Shield	46003321	Yoke
M19	Magnet		
	Trimmer Capacitor	26000141	Hue Range (4-25MMF)
	Knob	76003151	Fine tuning
	Knob	76002991	Channel Selector (yellow)
	Knob	76003161	Channel Selector (Beige)
	Knob	76003001	On-off-volume (yellow)
	Knob	76003171	On-off-volume (Beige)
	Knob	76003141	Tone
	Knob	76003231	Rear - Chroma and horizontal hold
	Knob	76003241	Rear - Hue and contrast
	Knob	76003251	Front - Contrast, Vert. Hold, Hue and Brightness
	Disc	76002851	UHF Indicator
	Dial Scale	76002961	UHF
	Mash	71001381	Chartreuse
	Mask	71001382	Beige

DISASSEMBLY INSTRUCTIONS

CABINET TOP REMOVAL

1. Remove 16 wood screws. Remove rear cover.

2. Remove 2 large bolts located at the upper right and left hand corners of the cabinet back.

3. Pull the cabinet top about 2 inches toward the rear and lift off.

CONTROL PANEL REMOVAL (RF-IF CHASSIS)

1. Remove control knobs.

2. Unfasten the 2 clips located at the bottoms of the holes thru which the channel selector and the off/on volume control shafts project.

3. Pull panel away from the cabinet.

CONTROL PANEL REMOVAL (SWEEP CHASSIS)

1. Locate the recessed finger grips on the bottom of the board running across the lower edge of the cabinet front.

2. Grasp the board with both hands and pull firmly away from the cabinet (same version may have a screw holding board in place).

RF-IF CHASSIS REMOVAL

1. Remove 12 push-on type control knobs from front panel of cabinet.

2. Remove 16 wood screws. Remove rear cover.

3. Remove 4 wood screws. Remove antenna terminal bracket.

4. Disconnect speaker plug, color plug and 2 power cables from deflection chassis.

5. Remove 1 metal screw from ground strap.

6. Remove 2 chassis bolts at the top of the cabinet.

7. Slide chassis straight out of guide.

SWEEP CHASSIS REMOVAL

1. Disconnect interlock plug, indication lamp plug, yoke plug and focus plug.

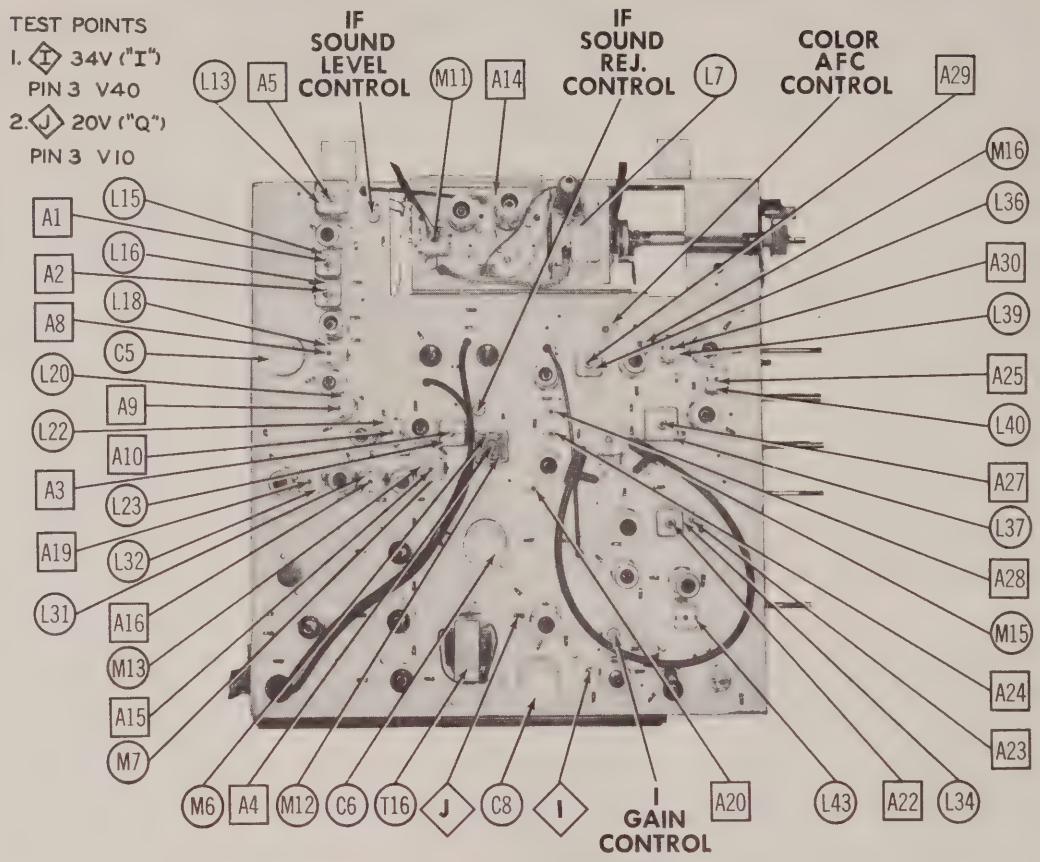
2. Remove 6 chassis bolts. Remove sweep chassis.

SPEAKER REMOVAL

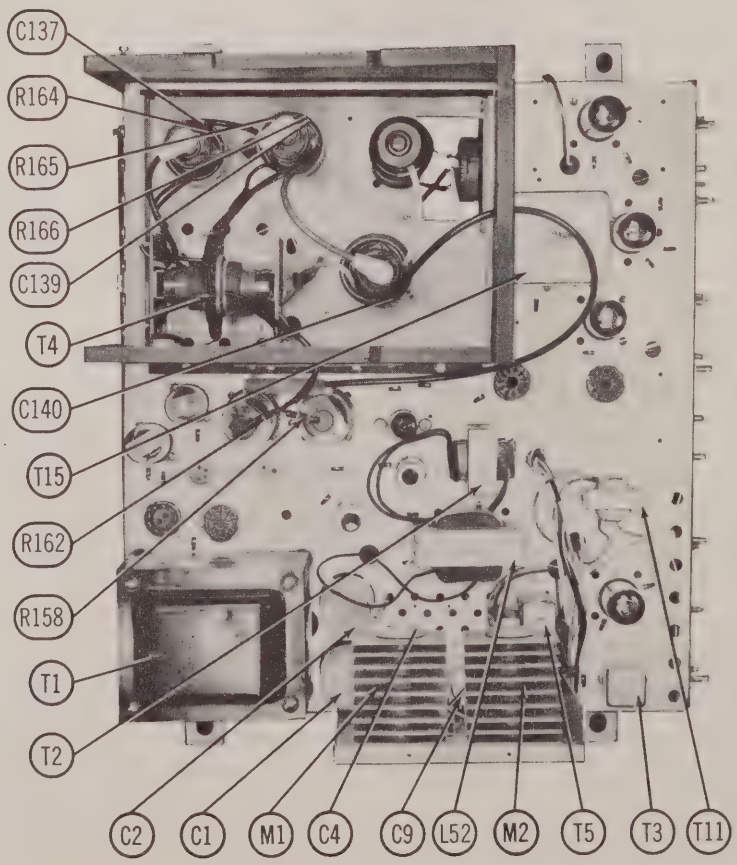
1. Disconnect speaker plug.

2. Remove 8 speaker nuts. Remove 2 speakers.

PROPERTY OF
L. F. MARKENSHIP
3082 LEWIS ST.
DENVER, COLORADO



RF-IF CHASSIS-TOP VIEW



SWEEP CHASSIS-TOP VIEW

MISCELLANEOUS ADJUSTMENTS (cont.)

PROPERTY OF
L. F. BLANKENSHIP
3324 MEADE ST.
DENVER, COLORADO

CONVERGENCE ADJUSTMENTS

Connect a dot generator across the antenna terminals. Recheck for convergence of dots near center of the screen.

If necessary, readjust the red, green and blue static convergence magnets and the lateral blue beam positioning magnet (M17) for dot convergence near center of the screen.

Turn the contrast and brightness controls for a low brightness dot display on picture tube screen.

Turn the red, green and blue horizontal parabola controls (located on rear apron of deflection chassis) until the three dots are positioned equally in a triangle pattern along a horizontal line thru the center of the screen.

If the dot group cannot be adjusted to form an equilateral triangle similar to Fig. 9, adjust the red, green and blue horizontal tilt controls. The horizontal tilt controls affect the outer edges of the triangle dot group along the horizontal center line. Adjust the red, green and blue. Convergence magnets (located on dynamic convergence yoke assembly (T14A, T14B, T14C) until approximately 1/16" spacing between the dots in each triangle group are obtained along a horizontal line.

Adjust the red, green and blue parabola controls (located on rear apron of deflection chassis) until the three dots are equally positioned in a triangle pattern along a vertical line thru the center of the screen. If the vertical dot triangle group cannot be adjusted to an equilateral triangle, adjust the red, green and blue vertical tilt controls.

The vertical tilt controls affect the top and bottom of the vertical triangle dot group. Due to interaction between the vertical parabola and tilt controls it may be necessary to retouch the vertical parabola controls.

Adjust the red, green and blue convergence magnets and the lateral blue beam positioning magnet until the red, green and blue dots are converged, both horizontally and vertically. The horizontal and vertical dots should now show maximum coverage over the entire picture tube screen, providing white dots.

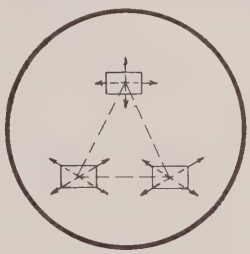


FIG. 9

WHITE ADJUSTMENT

Disconnect dot generator from antenna terminals. Turn set on and tune in a black and white picture.

Turn the contrast, blue screen and green screen controls to their maximum counter clockwise position.

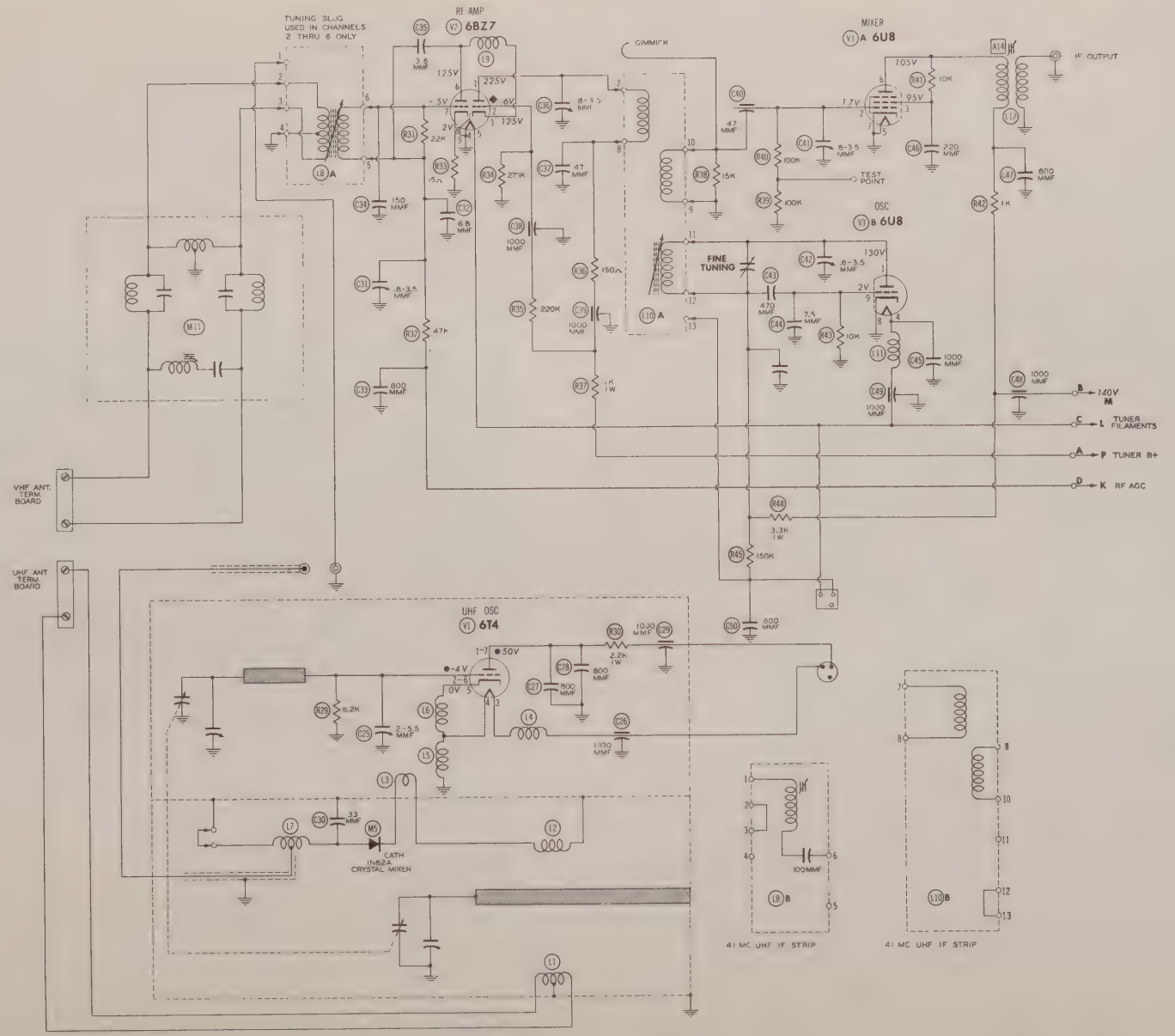
Turn the brightness control to its maximum clockwise position. Adjust the red, green and blue screen controls to obtain a low brightness white (grey).

Adjust the contrast control clockwise for a picture that is visible on screen.

Adjust the blue and green gain controls for a black and white picture. Turn the brightness control down to a reduced setting.

Adjust the blue and green background controls until the low brightness portions of the picture are white (neutral grey).

The entire procedure should be repeated until the picture remains black and white over all settings of the contrast and brightness controls.



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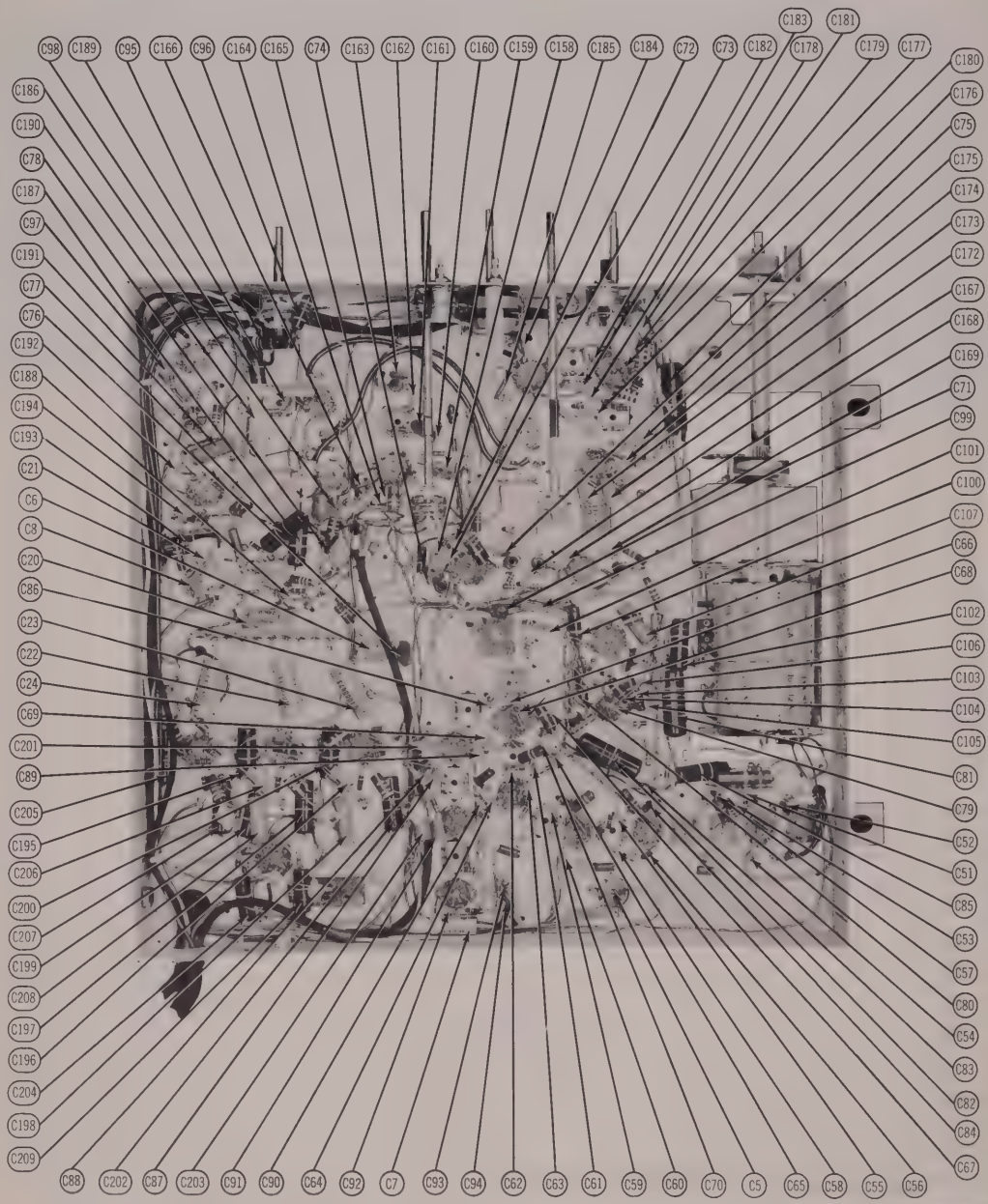
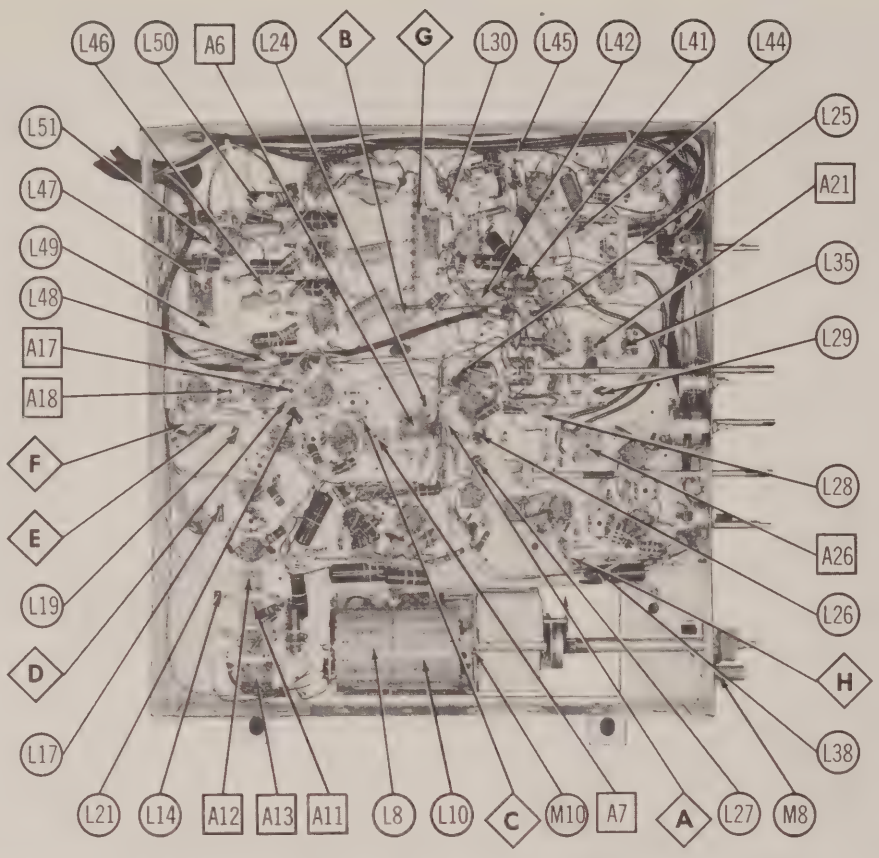
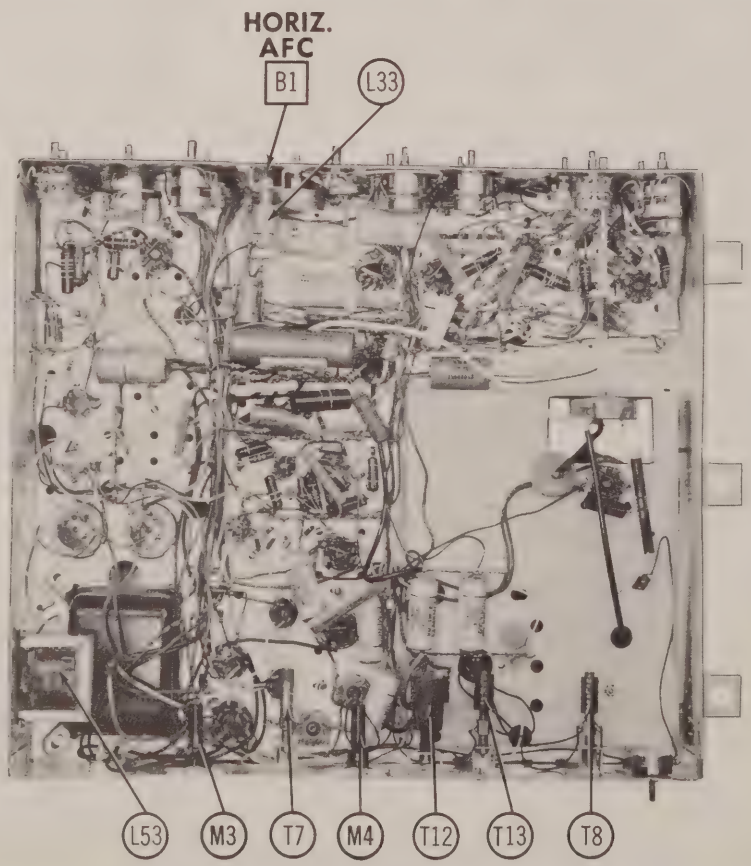
TUNER SCHEMATIC



RF-IF CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION

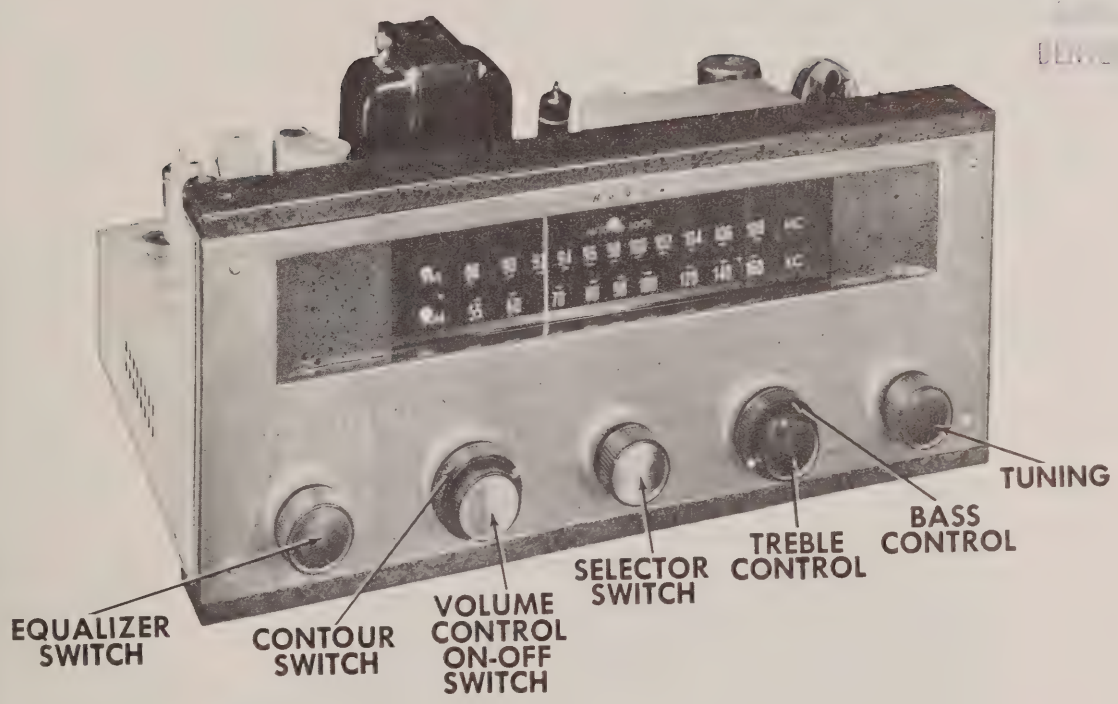


RF-IF CHASSIS-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



SWEEP CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENT.

DAVID BOGEN
MODEL R765



DAVID BOGEN
MODEL R765

TRADE NAME	David Bogen Model R765		
MANUFACTURER	David Bogen Co., Inc., 29 Ninth Ave., New York 14, N. Y.		
TYPE SET	AC Operated AM-FM Superheterodyne Tuner For Custom Installation		
TUBES	Seventeen		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING	.63 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	530KC-1650KC	FREQ. MOD.	88MC-108MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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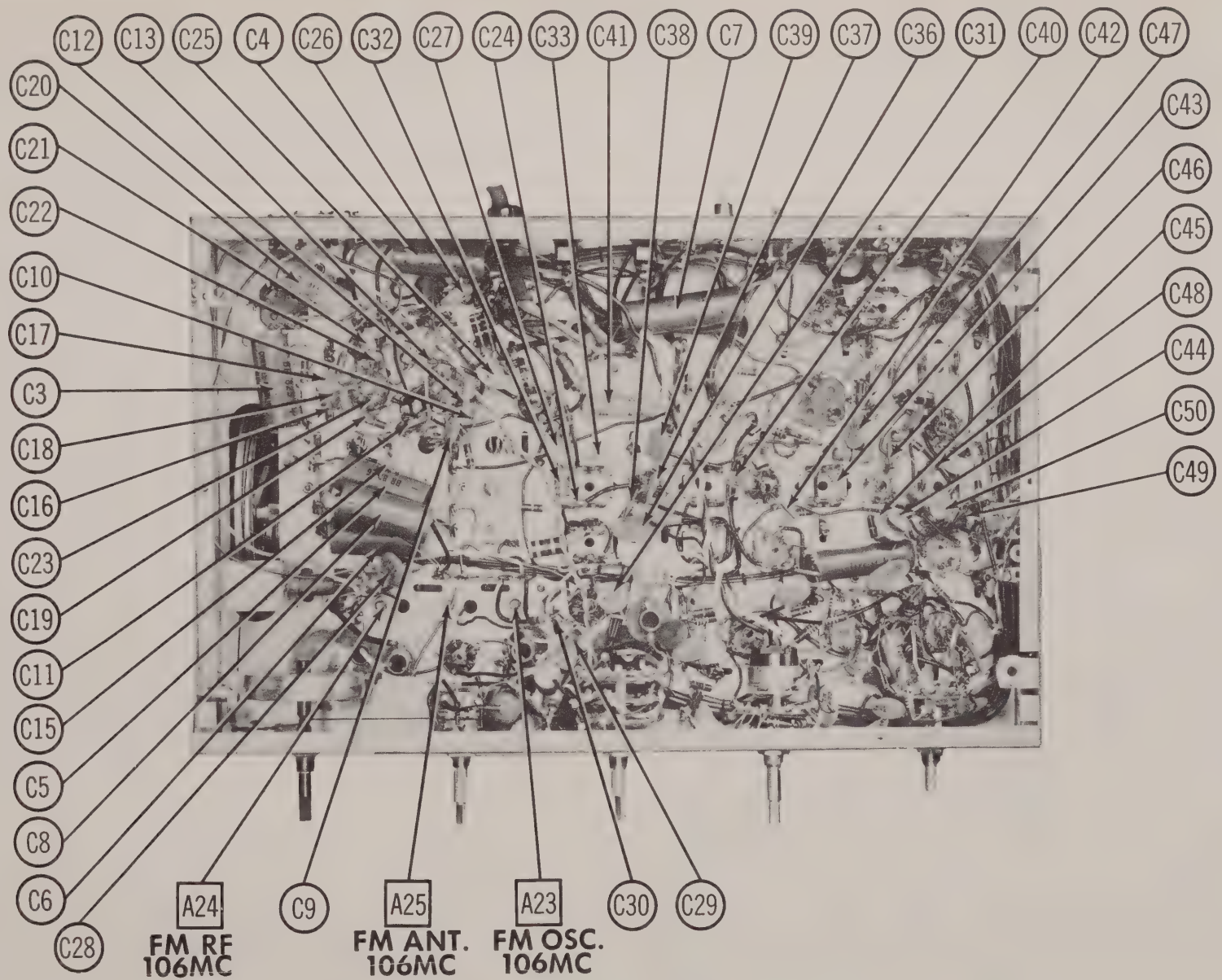
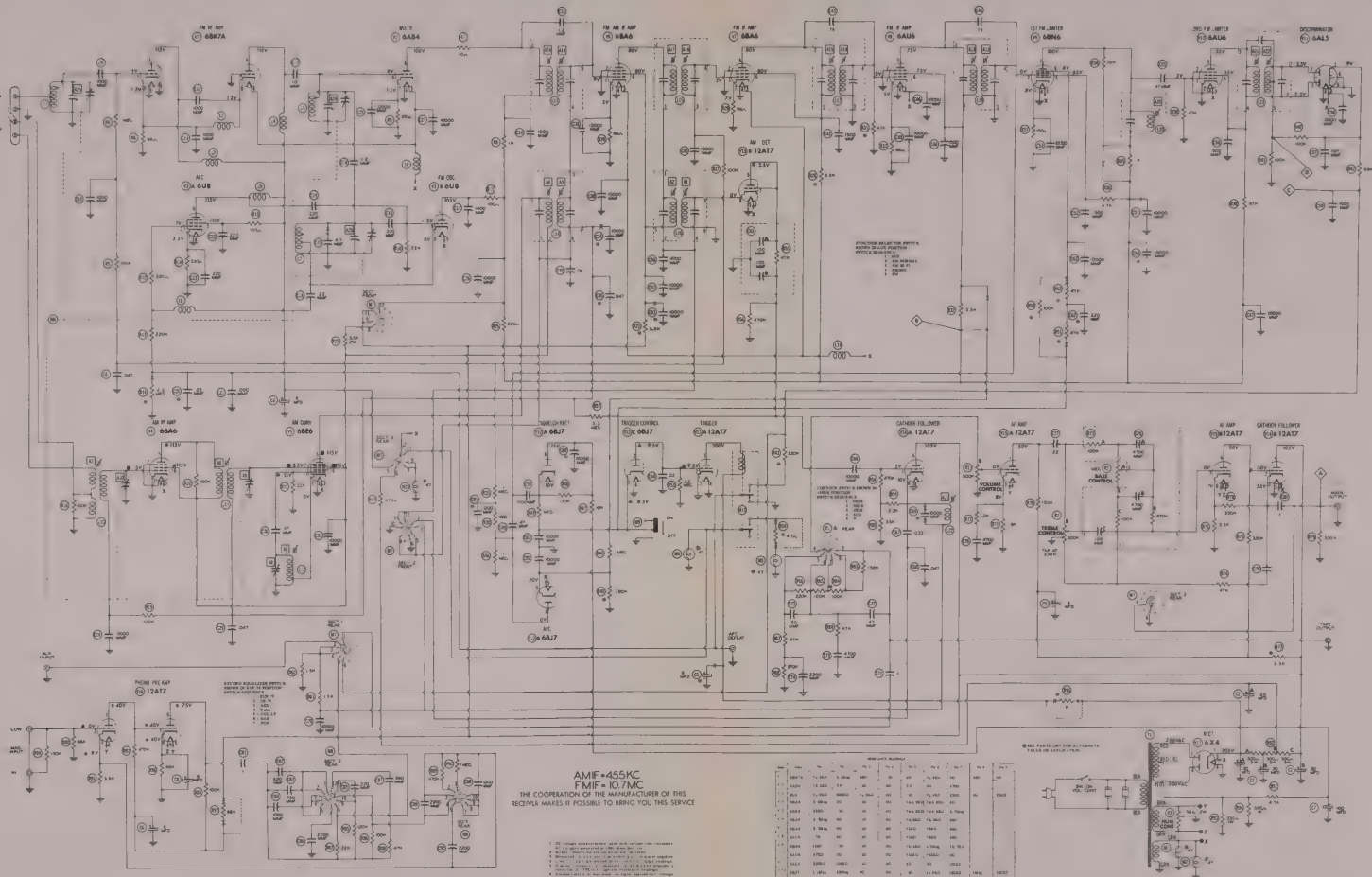


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION


AMF-455KC
FMF-107MC
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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293-3

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
In FM alignment be sure to short point Ⓑ (AVC) & "AFC Defeat" to ground (chassis).

AM ALIGNMENT

Disconnect shorting lug on terminals 2 & 3 of antenna strip and connect input lead (ground side) to terminal 2.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V13). Low side to chassis.	455KC (400∿ Mod.)	AM (Normal)	Tuning gang fully open.	DC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	200MMF	"	600KC	"	600KC	"	A5, A6, A7	"
3.	"	"	1500KC	"	1500KC	"	A8, A9, A10	Adjust for maximum deflection. Repeat steps 2 & 3.

10KC FILTER ADJ.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.1MFD	High side to pin 7 (grid) of 12AT7 (V14). Low side to chassis.	10KC (Unmod.)	"		DC probe to point A. Common to chassis.	A11	Adjust for minimum deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7M (Unmod.)	FM	Point of non-interference.	DC probe thru 100K to point Ⓑ. Common to chassis.	A12, A13 A14, A15 A16, A17 A18, A19	Adjust for maximum deflection.
6.	"	"	"	"	"	DC probe thru 100K to point Ⓓ. Common to chassis.	A20, A21	"
7.	"	"	"	"	"	DC probe thru 100K to point Ⓒ. Common to chassis.	A22	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

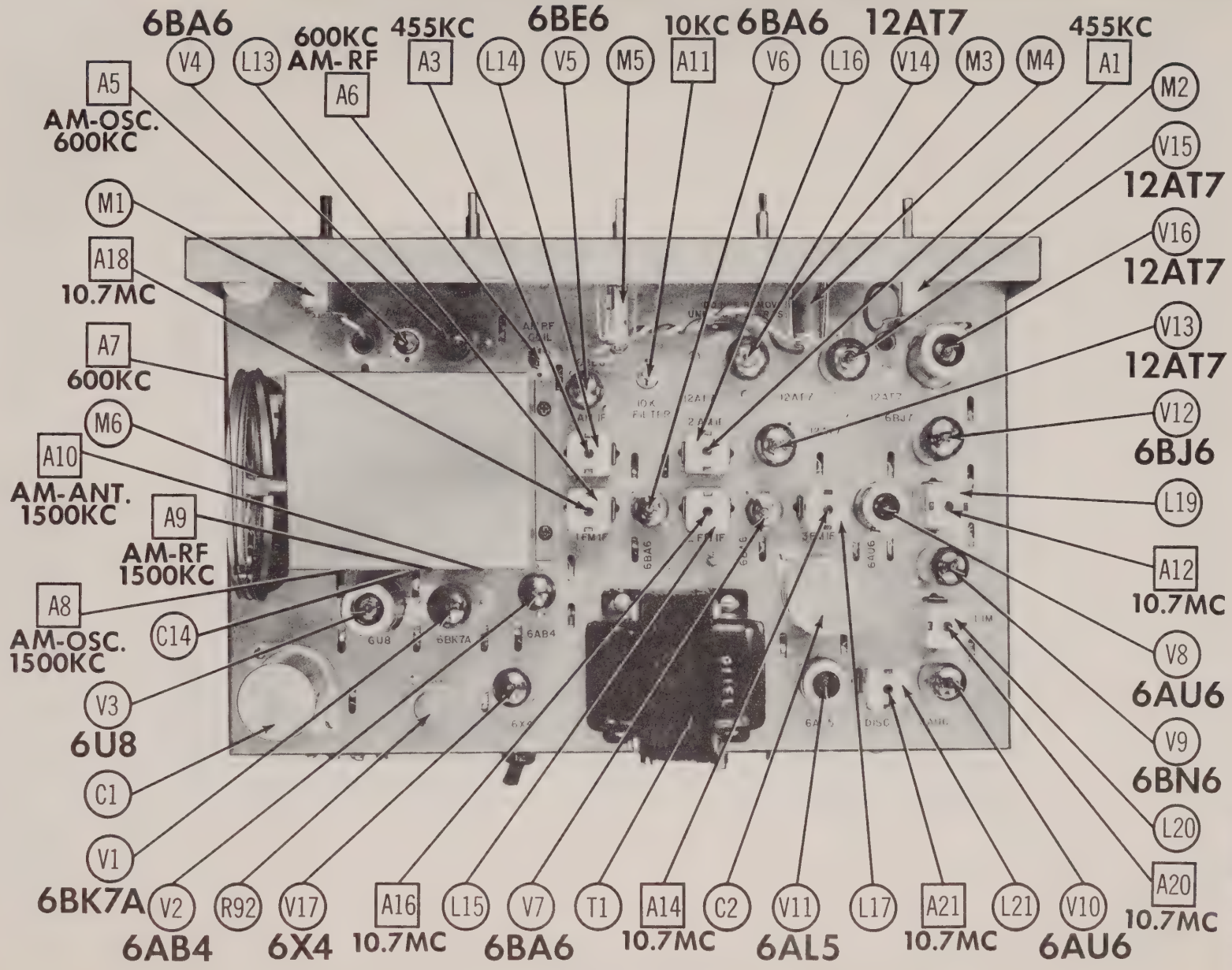
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7MC (450KC Sweep)	FM	Point of non-interference	Vert. Amp. thru 100K to point Ⓑ. Low side to chassis.	A12, A13 A14, A15 A16, A17 A18, A19	Adjust for maximum amplitude and symmetry similar to Fig. 1.
6.	"	"	"	"	"	Vert. Amp. thru 100K to point Ⓓ. Low side to chassis.	A20, A21	"
7.	"	"	"	"	"	Vert. Amp. thru 100K to point Ⓒ. Low side to chassis.	A22	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. Slightly retouch A20 and A21 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	300Ω Carbon resistor	High side to FM antenna terminal. Low side to chassis.	106MC (Unmod.)	FM	106MC	DC probe thru 100K to point Ⓐ. Common to chassis.	A23, A24 A25	Adjust for maximum deflection.
9.	"	"	90MC	"	90MC	"		Check tracking. If necessary, repeat step 8.

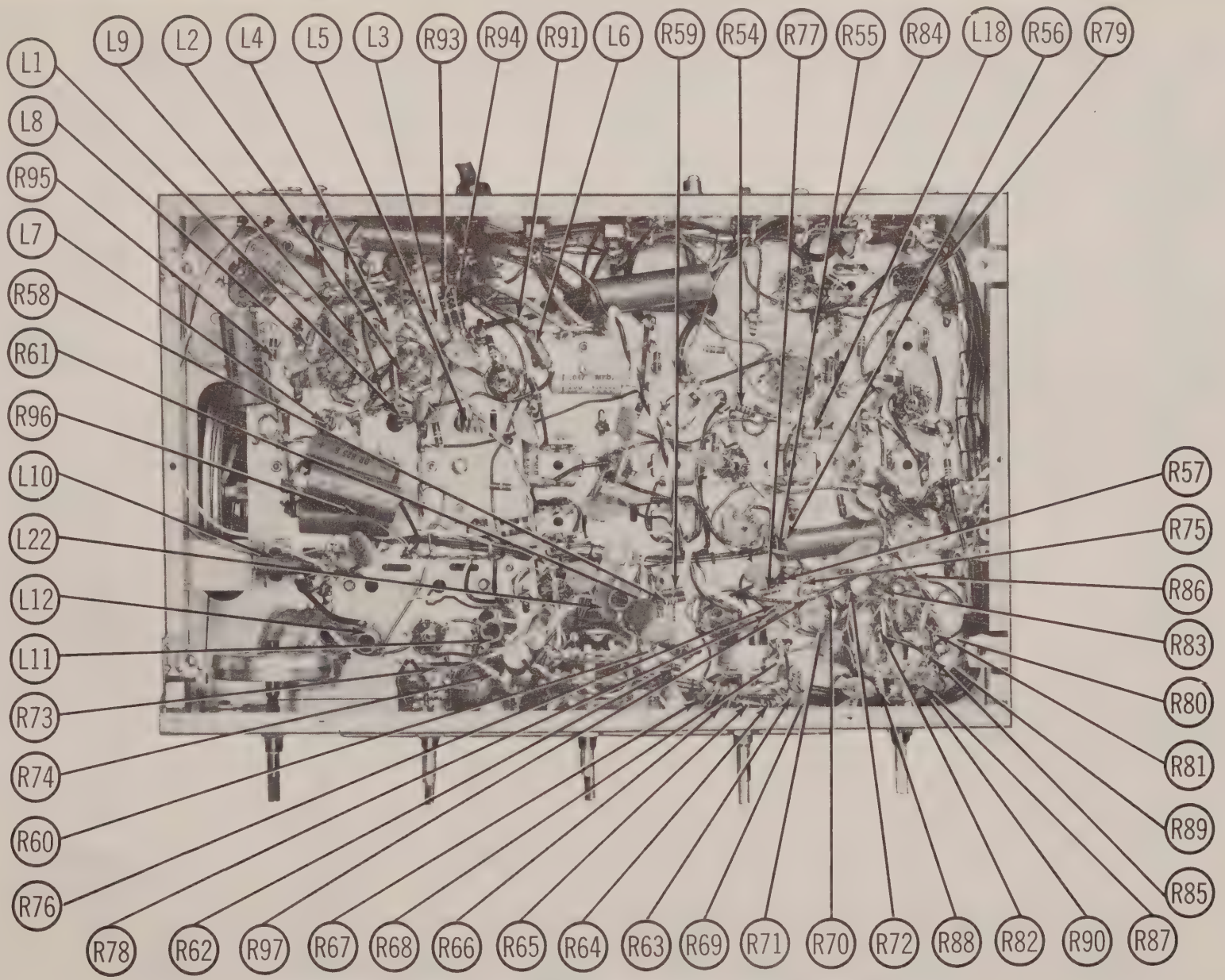
FIG. 1

FIG. 2

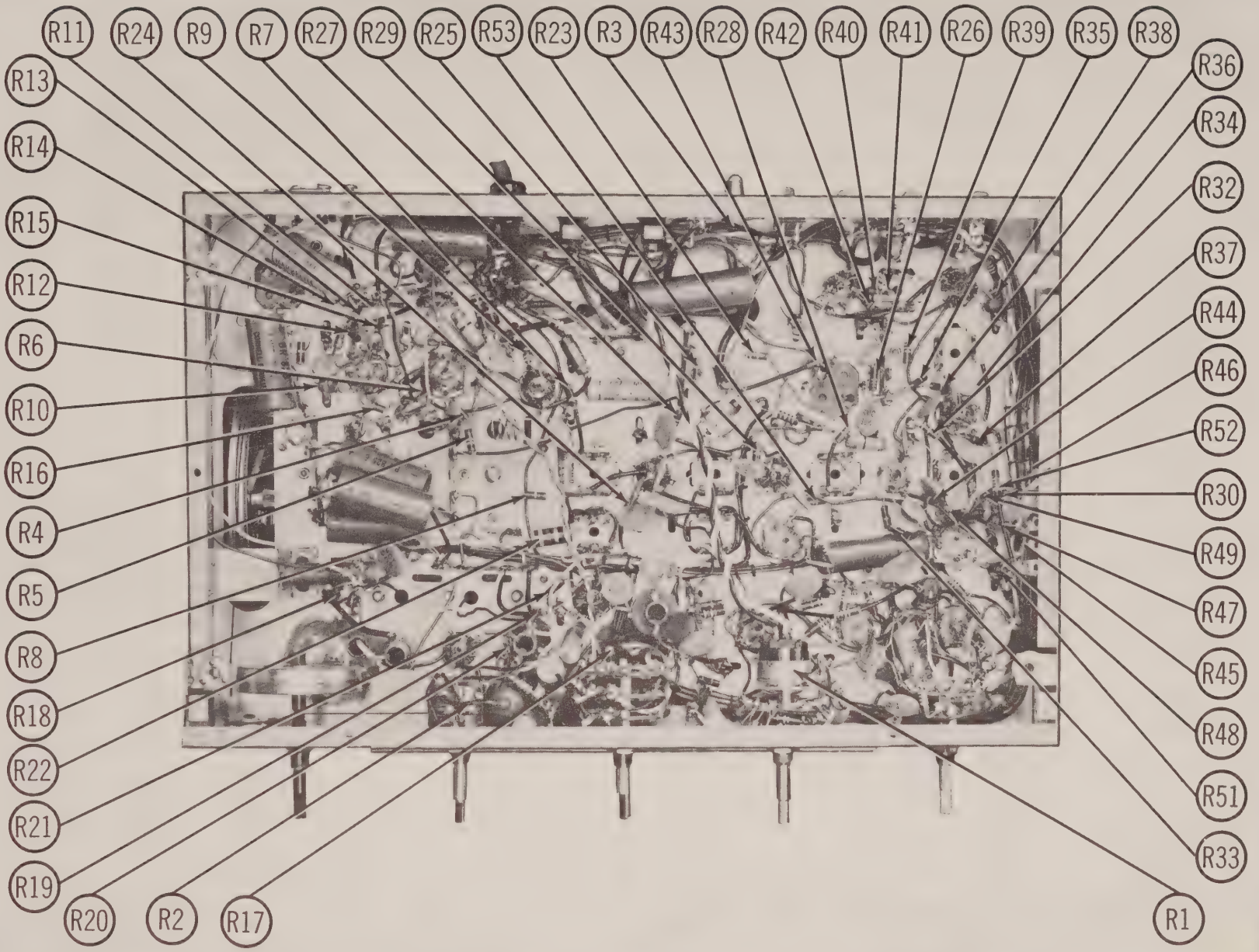


CHASSIS TOP VIEW

PROPERTY OF
L. F. [illegible]
[illegible] ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: David Bogen PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	FM RF Amp.	6BK7A	6BK7A	9AJ	
V2	FM Mixer	6AB4	6AB4	5CE	
V3	FM Osc. -AFC	6U8	6U8	9AE	
V4	AM RF Amp.	6BA6	6BA6	7BK	
V5	AM Converter	6BE6	6BE6	7CH	
V6	FM AM IF Amp.	6BA6	6BA6	7BK	
V7	FM IF Amp.	6BA6	6BA6	7BK	
V8	FM IF Amp.	6AU6	6AU6	7BK	
V9	1st FM Limiter	6BN6	6BN6	7DF	
V10	2nd FM Limiter	6AU6	6AU6	7BK	
V11	FM Disc.	6AL5	6AL5	6BT	
V12	AVC-Squelch Rect. -Trigger Control	6BJ7	6BJ7	9AX	
V13	Trigger-AM Det.	12AT7	12AT7	9A	
V14	Cathode Follow	12AT7	12AT7	9A	
V15	AF Amp.	12AT7	12AT7	9A	
V16	Phono Pre-Amp.	12AT7	12AT7	9A	
V17	Rect.	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: David Bogen PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲20	450				FP376.5	TM-T20-450	T-140	
B	▲20	450							
C2A	▲20	450				FP376.5	TM-T20-450	T-140	
B	▲20	450							
C3	8	250				TC51	TD-8-250	MT-2508	Note 2
C4	8	250				TC51	TD-8-250	MT-2508	
C5	8	250				TC51	TD-8-250	MT-2508	
C6	8	250				TC51	TD-8-250	MT-2508	
C7	100	25				TC2501	TD-100-25	MTH-2510	
C8	8	250				TC51	TD-8-250	MT-2508	
C9	1000				811-102			KR-1210	
C10	1000				811-102			KR-1210	
C11	1000				811-102			KR-1210	
C12	1000				811-102			KR-1210	
C13	10			DD-100	831-100	ZT-541		KR-1510	
C14	1.2			TCZ-1	NPOA-010	ZT-5515			
C15	4.7				N330A-4R7				
C16	220			DD-221	811-221			KR-1322	
C17	1000				811-102			KR-1210	
C18	22			D6-220	831-220	UC-5422		KR-1422	
C19	220			DD-221	811-221			KR-1322	
C20	.25	200				PT4025	IMP2-P25	3302025	Note 1
C21	1000				811-102			KR-1210	
C22	220			DD-221	811-221			KR-1322	
C23	220			DD-221	811-221			KR-1322	
C24	1000			DD-221	811-102			KR-1210	
C25	10000			DD-103	811-01	DC511		C-06110	
C26	10000			DD-103	811-01	DC511			
C27	10000			DD-103	811-01	DC511		C-06110	
C28	10000			DD-103	811-01	DC511		C-06110	
C29	.047	200		DF-503		PT4147	IMP2-S47	3302147	
C30	47			DD-470	831-470	ZT-5447		KR-1447	
C31	10000			DD-103	811-01	DC511			
C32	.01	200		D6-103	GP3-333-103	PT411	IMP4-S1	330211	
C33	1.2			TCZ-1	NPOA-010	ZT-5515			
C34	10000			DD-103	811-01	DC511		C-06110	Note 2
C35	.047			DF-503		PT4147	IMP2-S47	3302147	Note 2
C36	4700							CR-1247	
C37	10000			DD-103	811-01	DC511			
C38	10000			DD-103	811-01	DC511		CR-1247	
C39	10000			DD-103	811-01	DC511		CR-1247	
C40	10000			DD-103	811-01	DC511		CR-1247	
C41	.047	200		DF-503		PT4147	IMP2-S47	3302147	
C42	1500				811-152			CR-1215	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: David Bogen PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C43	.75								
C44	1500				811-152			CR-1215	
C45	10000			DD-103	811-01	DC511		C-06110	
C46	10000			DD-103	811-01	DC511		C-06110	
C47	10000			DD-103	811-01	DC511		C-06110	
C48	.75								
C49	47			DD-470	831-470	ZT-5447		KR-1447	
C50	1000				811-102			KR-1210	
C51	10000			DD-103	811-01	DC511			
C52	1500				811-152				
C53	10000			DD-103	811-01	DC511		C-06110	
C54	10000			DD-103	811-01	DC511			Note 2
C55	47			DD-470	831-470	ZT-5447		KR-1447	
C56	1500				811-152			CR-1215	
C57	100			DD-101	801-101	ZT-531		K-1310	
C58	10000			DD-103	811-01	DC511		C-06110	
C59	1000				811-102			KR-1210	
C60	10000			DD-103	811-01	DC511			Note 3
C61	10000			DD-103	811-01	DC511		C-06110	
C62	220			DD-221	811-221			KR-1322	Note 2
C63	10000			DD-103	811-01	DC511		C-06110	
C64	.22	200				PT4022	IMP2-P22	3302022	
C65A	100	♦		♦PC-50	♦1403-01	UC-531		K-1310	
B	100	♦				UC-531		K-1310	
C66	10000			DD-103	811-01	DC511			
C67	.033	200		DF-303		PT4133	IMP6-S3	3306133	
C68	.047	200		DF-503		PT4147	IMP2-S47	3302147	
C69	10000			DD-103	811-01	DC511		C-06110	Note 2
C70	10000			DD-103	811-01	DC511		C-06110	
C71	.1	200		DF-104		PT401	IMP2-P1	330201	
C72	47			DD-470	831-470	ZT-5447		KR-1447	
C73	150			DD-151	811-151	ZT-5315		KR-1315	
C74	2200							KR-1222	
C75	4700							CR-1247	
C76	4700							CR-1247	
C77	.22	200				PT4022	IMP2-P22	3302022	
C78A	4700	†						CR-1247	
B	4700	†						CR-1247	
C	100	†						KR-1310	
C79	.1	200		DF-104		PT401	IMP2-P1	330201	
C80	.1	200		DF-104		PT401	IMP2-P1	330201	
C81	.1	200		DF-104		PT401	IMP2-P1	330201	
C82	620							KR-1362	
C83	750				811-751			KR-1375	
C84	1000				811-102			KR-1210	
C85	220			DD-221	811-221			KR-1322	
C86	2200							CR-1222	
C87	390			DD-391	811-391			KR-1339	
C88	1200				811-122			CR-1212	
C89	2200							CR-1222	
C90	2200							CR-1222	
C91	1000				811-102			KR-1210	Note 4
C92	10000			DD-103	811-01	DC-511			
C93	10000			DD-103	811-01	DC-511			Note 2

♦Items C65A, C65B and R55 are combined in one unit.
†Items C78A, C78B, C78C, R73A, R73B, and R73C are combined in one unit.
Note 1. Some versions may use a .047MMF capacitor in this application.
Note 2. Not used in some versions.
Note 3. Some versions may use a 1000MMF unit in this application.
Note 4. Some versions may use a 10,000MMF unit in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: David Bogen PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	Switch		S427A					Contour Switch (Panel)
B	500KΩ	½		Q13-133	A47-500K-Z	AB-60	U-48	Volume Attach to R1A (Rear)
C	Shaft			NQ	RS-3/16	AK-8	DS-37	Attach to R1B
D	Switch			76-1	SWE-12	KB-1	US-26	Attach to R1B
R2A	1Meg	½	V-358B			F1-51	UF16L	Bass (Panel)
B	500K	½	Not Req.			R2-46	UR55-T254	Treble (Rear)Attach to R2A, Tap at 250KΩ
R3	50Ω	2	V-113				C-50P	Hum Balance (Wire Wound)

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA David Bogen PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R4	1Meg	½		BTS-1Meg	
R5	100KΩ	½		BTS-100K	
R6	68Ω	½		BTS-68	
R7	10Ω	½		BTS-10	
R8	1000Ω	½		BTS-1000	
R9	470Ω	½		BTS-470	
R10	22KΩ	½		BTS-22K	
R11	100Ω	½		BTS-100	
R12	220Ω	½		BTS-220	
R13	220KΩ	½		BTS-220K	
R14	2.2Meg	½		BTS-2.2Meg	Note 3.
R15	100Ω	½		BTS-100	
R16	330Ω	½		BTS-330	
R17	470Ω	½		BTS-470	
R18	100KΩ	½		BTS-100K	
R19	100KΩ	½		BTS-100K	
R20	100KΩ	½		BTS-100K	
R21	22KΩ	½		BTS-22K	
R22	3300Ω	2		BTB-3300	
R23	3300Ω	½		BTS-3300	Note 1.
R24	68Ω	½		BTS-68	
R25	1Meg	½		BTS-1Meg	
R26	220Ω	½		BTS-220	
R27	100KΩ	½		BTS-100K	
R28	3300Ω	½		BTS-3300	Note 2
R29	68Ω	½		BTS-68	
R30	1Meg	½		BTS-1Meg	
R31	47KΩ	½		BTS-47K	Note 3.
R32	3300Ω	½		BTS-3300	
R33	68Ω	½		BTS-68	
R34	10KΩ	½		BTS-10K	
R35	1000Ω	½		BTS-1000	
R36	4700Ω	½		BTS-4700	
R37	150Ω	½		BTS-150	
R38	47KΩ	½		BTS-47K	
R39	47KΩ	½		BTS-47K	
R40	100KΩ	½		BTS-100K	
R41	100KΩ	½		BTS-100K	
R42	68KΩ	½		BTS-68K	
R43	220KΩ	½		BTS-220K	Note 4.
R44	1Meg	½		BTS-1Meg	
R45	390KΩ	½		BTS-390K	Note 5.
R46	1Meg	½		BTS-1Meg	
R47	10KΩ	½		BTS-10K	
R48	150KΩ	½		BTS-150K	
R49	1Meg	½		BTS-1Meg	
R50	100KΩ	½		BTS-100K	Note 6.
R51	47KΩ	½		BTS-47K	Note 3.
R52	47KΩ	½		BTS-47K	Note 3.
R53	22Meg	½		BTS-22Meg	
R54	4.7Ω 5%	½			Note 3.
R55	47KΩ	½		BTS-47K	
R56	470KΩ	½		BTS-470K	
R57	3.3Meg	½		BTS-3.3Meg	
R58	470KΩ	½		BTS-470K	
R59	2200Ω	½		BTS-2200	
R60	33KΩ	½		BTS-33K	
R61	1500Ω	½		BTS-1500	
R62	1500Ω	½		BTS-1500	
R63	150KΩ	½		BTS-150K	Note 7.
R64	100KΩ	½		BTS-100K	
R65	100KΩ	½		BTS-100K	
R66	220KΩ	½		BTS-220K	
R67	47KΩ	½		BTS-47K	
R68	270KΩ	½		BTS-270K	
R69	47KΩ	½		BTS-47K	
R70	100KΩ	½		BTS-100K	
R71	1800Ω	½		BTS-1800	
R72	1200Ω	½		BTS-1200	
R73A	100KΩ	½		BTS-100K	
B	470KΩ	½	†	BTS-470K	
C	100KΩ	½		BTS-100K	
R74	47KΩ	½		BTS-47K	
R75	330KΩ	½		BTS-330K	
R76	3300Ω	½		BTS-3300	
R77	3300Ω	½		BTS-3300	Note 8.
R78	330KΩ	½		BTS-330K	
R79	330KΩ	½		BTS-330K	
R80	68KΩ	½		BTS-68K	
R81	3900Ω	½		BTS-3900	
R82	470KΩ	½		BTS-470K	
R83	100KΩ	½		BTS-100K	
R84	150KΩ	½		BTS-150K	
R85	120KΩ	½		BTS-120K	
R86	100KΩ	½		BTS-100K	
R87	22KΩ	½		BTS-22K	
R88	47KΩ	½		BTS-47K	
R89	470KΩ	½		BTS-470K	
R90	1MegΩ	½		BTS-1Meg	
R91	4700Ω	½		BTS-4700	
R92A	500Ω	5		PW7-500	
B	500Ω	5	§	PW7-500	
C	500Ω	5		PW7-500	
R93	330Ω	1		BTA-330	
R94	330Ω	1		BTA-330	
R95	1000Ω	½		BTS-1000	Note 3.
R96	68KΩ	½		BTS-68K	
R97	68KΩ	½		BTS-68K	

Note 1. A 1000Ω ½W resistor is used in some versions.
Note 2. A 1000Ω ½W resistor is used in some versions.
Note 3. Not used in some versions.
Note 4. A 1Meg ½W resistor is used in some versions.
Note 5. A 100K ½W resistor is used in some versions.
Note 6. Not used in some versions.
Note 7. A 100KΩ ½W resistor is used in some versions.
Note 8. A68KΩ ½W resistor is used in some versions.
♦ Items C65A, C65B, R55 are combined in one unit.
§ Items C78A, C78B, C78C, R73A, R73B, R73C are combined in one unit.
† Items R92A, R92B, R92C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .63A	450VCT .079ADC	5VAC @ .64A	6.3VAC @ 5.6A	T3116					

PARTS LIST AND DESCRIPTIONS (Continued)

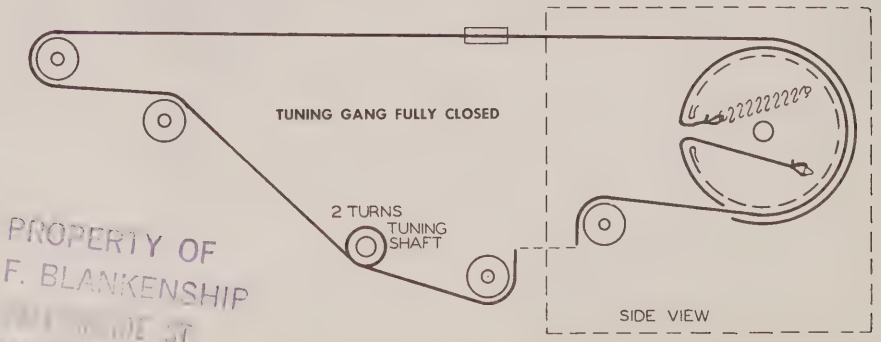
COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA David Bogen PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM antenna coil	0Ω		U430				Tapped
L2	Cathode choke	.1Ω		U504	19-1002		4606	2 Microhenries
L3	RF coil	.8Ω		U501	19-1000		4602	1 Microhenry, IRC part No. CLA
L4	RF coil	3Ω		U507	19-1003		4608	3.3 Microhenries, IRC Part No. CLA
L5	FM RF coil	0Ω		U429				Tapped
L6	Fil. choke	0Ω		U501	19-1000		4602	1 Microhenry
L7	FM Osc. coil	0Ω		U431				Tapped
L8	RF coil	0Ω		U432				
L9	RF coil	3Ω		U507	19-1003		4608	3.3 Microhenries, IRC Part No. CLA
L10	AM Ant. coil	34Ω*	2.6Ω	U304				*Tapped @ 33.9Ω
L11	AM RF coil	75Ω	3Ω	U301				
L12	AM Osc. coil	2.6Ω		U303	14-1060*	BC-381■	71-Osc.*	Tapped @ .3Ω
L13	1st FM IF	.6Ω	.6Ω	H294	16-3487	FM-254	1463	
L14	1st AM IF	17Ω	17Ω	H368				
L15	2nd FM IF	.7Ω	.7Ω	H355	16-3487	FM-254	1463	
L16	2nd AM IF	16Ω	16Ω	H368				
L17	3rd FM IF	.6Ω	.6Ω	H355	16-3487	FM-254	1463	
L18	Fil. Choke	.8Ω		U501	19-1000		4602	1 Microhenry, IRC Part No. CLA
L19	1st FM Limiter	.6Ω	.6Ω	H355	16-3487	FM-254	1463	
L20	2nd FM Limiter	.6Ω		H371	16-3487▲	FM-254▲	1463▲	
L21	Discriminator	.7Ω	1.2ΩCT	H295	17-3494	FM-253	1464	
L22	10KC Filter	110Ω		U201	19-1576	TV-163	6210	

* Use primary winding.
■ Use secondary winding.
▲ Detune unused winding.

MISCELLANEOUS

ITEM No.	PART NAME	David Bogen PART No.	NOTES
M1	Pilot Light		#47
M2	Pilot Light		#47
M3	Dial Light		#47-AM Dial
M4	Dial Light		#47-FM Dial
M5	Dial Light		#47-Auto-Lock (AFC)
M6	Tuning Cap.	C-619C	6Gang (AM Sections-35-555MMF, 34-550MMF, 34-205MMF)
M7	Switch	S-428A	Selector (Rotary-Wafer Type)
M8	Switch	S-429A	Equalizer (Rotary-Wafer Type)
M9	Switch	S-381	Squelch (DPDT-Slide Type)
M10	Relay		AFC Auto-Lock



DIAL CORD STRINGING

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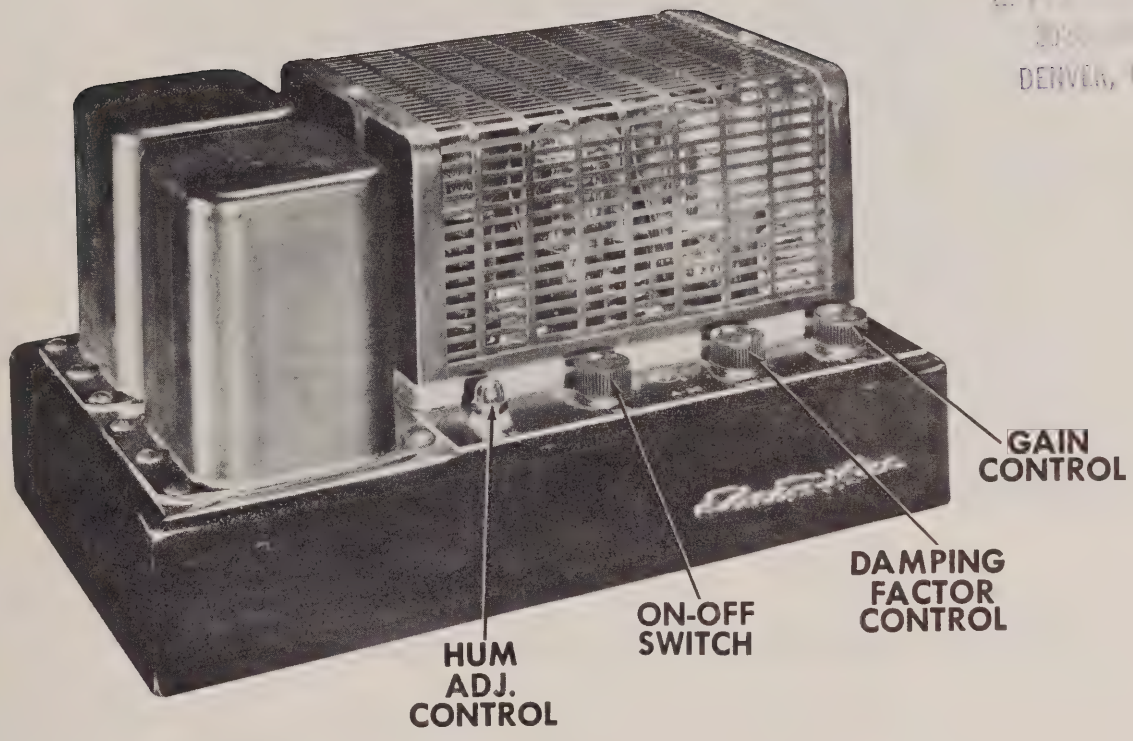
ELECTRO-VOICE
MODEL A30



ELECTRO-VOICE
MODEL A30

TRADE NAME	Electro-Voice Model A30
MANUFACTURER	Electro-Voice, Inc., Buchanan, Michigan
TYPE SET	AC Operated 30 Watt Audio Amplifier
TUBES (Six)	Types 12AX7 AF Amp.-Phase Inv., 12BH7 Driver, (2) 6BG6G Output, (2) 5Y3GT Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles
RATING	.83 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Electro-Voice PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	AF Amp. - Phase Inv.	12AX7	12AX7	9A	
V2	Driver	12BH7	12BH7	9A	
V3	Audio Output	6BG6G	6BG6G	5BT	
V4	Audio Output	6BG6G	6BG6G	5BT	
V5	Rectifier	5Y3GT	5Y3GT	5T	
V6	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: Electro-Voice PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲40	500	4247			FP288	TM-D40-500	D-275	
B	▲40	500							
C2A	▲40	500	4247			FP288	TM-D40-500	D-275	
B	▲40	500							
C3	20	450	4246			FP144	TM-20-450	S-260	
C4	50	100	4242			TC49	TD-50-150	FM-1550	
C5A	▲500	25	4249			TC2505	TD-500-25	MTH-2550	
B	▲500	25				TC2505	TD-500-25	MTH-2550	
C6	.1	200	4265	DF-104		PT401	IMP4-P1	330201	
C7	50		4264	DD-500	GP1K-500	UC-545		K-1450	
C8	.022	400	4260	DF-203		PT4122	IMP4-S22	3304122	
C9	.047	400	4243	DF-503		PT4147	IMP4-S47	3304147	
C10	.047	400	4243	DF-503		PT4147	IMP4-S47	3304147	
C11	.1	600	4241	DF-104		PT601	IMP6-P1	330601	
C12	.1	600	4241	DF-104		PT601	IMP6-P1	330601	
C13	10000		4252	DD-103	811-01	DC511	IMP4-S1	330411	
C14	10000		4252	DD-103	811-01	DC511	IMP4-S1	330411	
C15	.047	400	4243	DF-503		PT4147	IMP4-S47	3304147	
C16	.047	400	4243	DF-503		PT4147	IMP4-S47	3304147	

CONTROLS

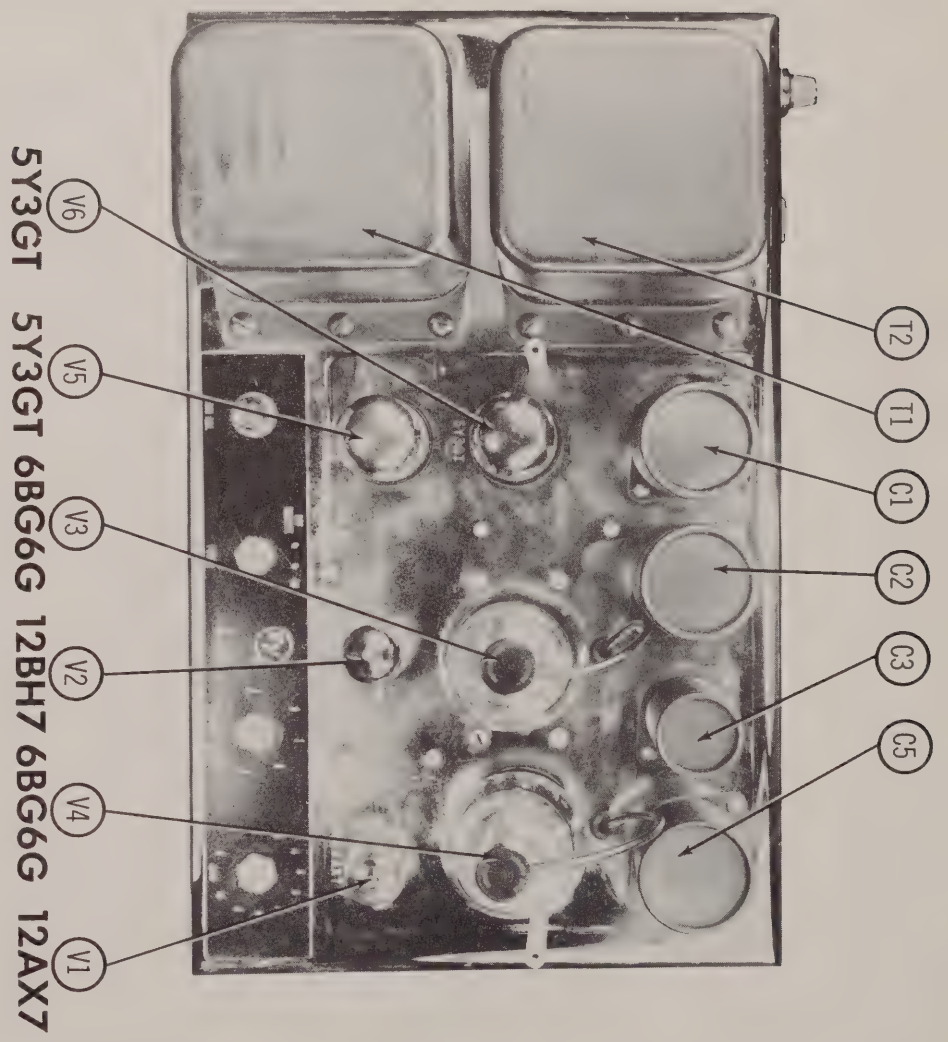
ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: Electro-Voice PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	200Ω	2	D-4686	W-200	A43-200	VK-123	R25OL	Balancing (Wire Wound)
R2A	1Ω	2	A-4686					Damping Factor (Wire Wound)
B	1800Ω	2	Not Req.					Wire Wound
R3A	250KΩ	½	C-4686	Q13-130	A47-250K-Z	B-51	U-44	Gain
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: Electro-Voice PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R4	2.7Ω 5%	1	4680		
R5	270KΩ	½	4669	BTS-270K	
R6	1.2Meg	½	4656	BTS-1.2Meg	
R7	470Ω	½	4654	BTS-470	
R8	27KΩ	½	4651	BTS-27K	
R9	27KΩ	½	4651	BTS-27K	
R10	56KΩ	½	4652	BTS-56K	
R11	56KΩ	½	4652	BTS-56K	
R12	470KΩ	½	4650	BTS-470K	
R13	1200Ω	½	4658	BTS-1200	
R14	12KΩ	2	4679	BTB-12K	
R15	470K	½	4650	BTS-470K	
R16	12KΩ	2	4679	BTB-12K	
R17	470KΩ	½	4650	BTS-470K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: Electro-Voice PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R18	120Ω	½	4607	BTS-120	
R19	33Ω	½	4681	BTS-33	
R20	470KΩ	½	4650	BTS-470K	
R21	120Ω	½	4607	BTS-120Ω	
R22	33Ω	½	4681	BTS-33	
R23	220Ω	½	4664	BTS-220	
R24	47KΩ	½	4668	BTS-47K	
R25	33KΩ	½	4665	BTS-33K	
R26	39KΩ	2	4682	BTB-39K	
R27	39KΩ	2	4682	BTB-39K	
R28	47Ω	2	4683		
R29	100Ω	4	4684	PW4-100	
R30	100Ω	4	4684	PW4-100	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Electro-Voice PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .83A	730VCT .040ADC	724VCT .037ADC	40VAC .0015ADC	96P44					
	SEC 4	SEC 5	SEC 6	SEC 7						
	22VAC	5VAC @ 2A	5VAC @ 2A	6.3VAC @ 2.7A						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Electro-Voice PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	1030Ω CT Tap @ 600Ω CT	16Ω Tap @ 8Ω, 4Ω	96A14B						

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Electro-Voice PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1 M2	.0015		1016 1159	B1B CR-10	8S20 ①		154B 10	① Fabricate mounting.

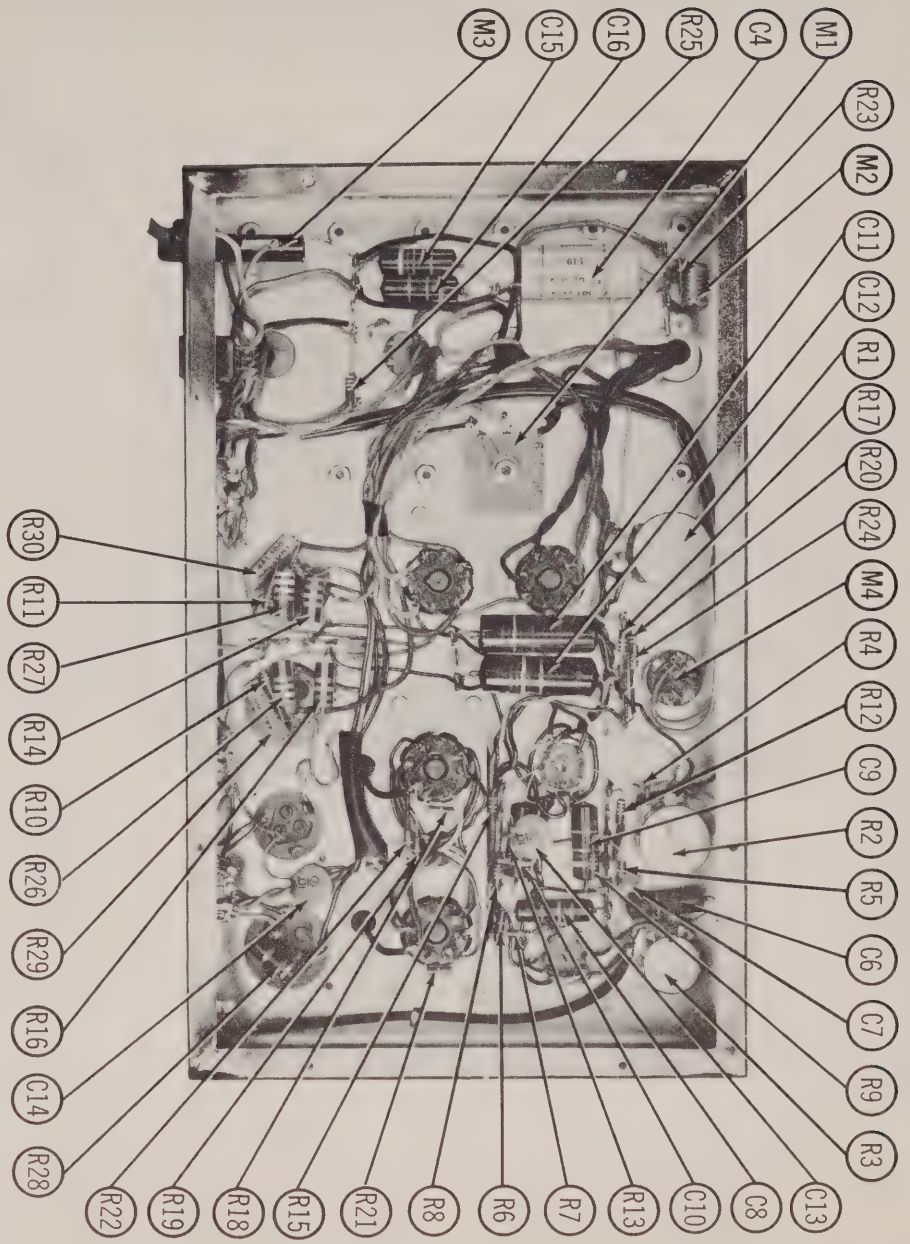
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Electro-Voice PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	3AG S/B	2A 125V	313002		313002, (3AG-S/B-2A)	342001	MDL2	HKP

MISCELLANEOUS

ITEM No.	PART NAME	Electro-Voice PART No.	NOTES
M4	Switch	5641	On-Off (Power)

CHASSIS—BOTTOM VIEW



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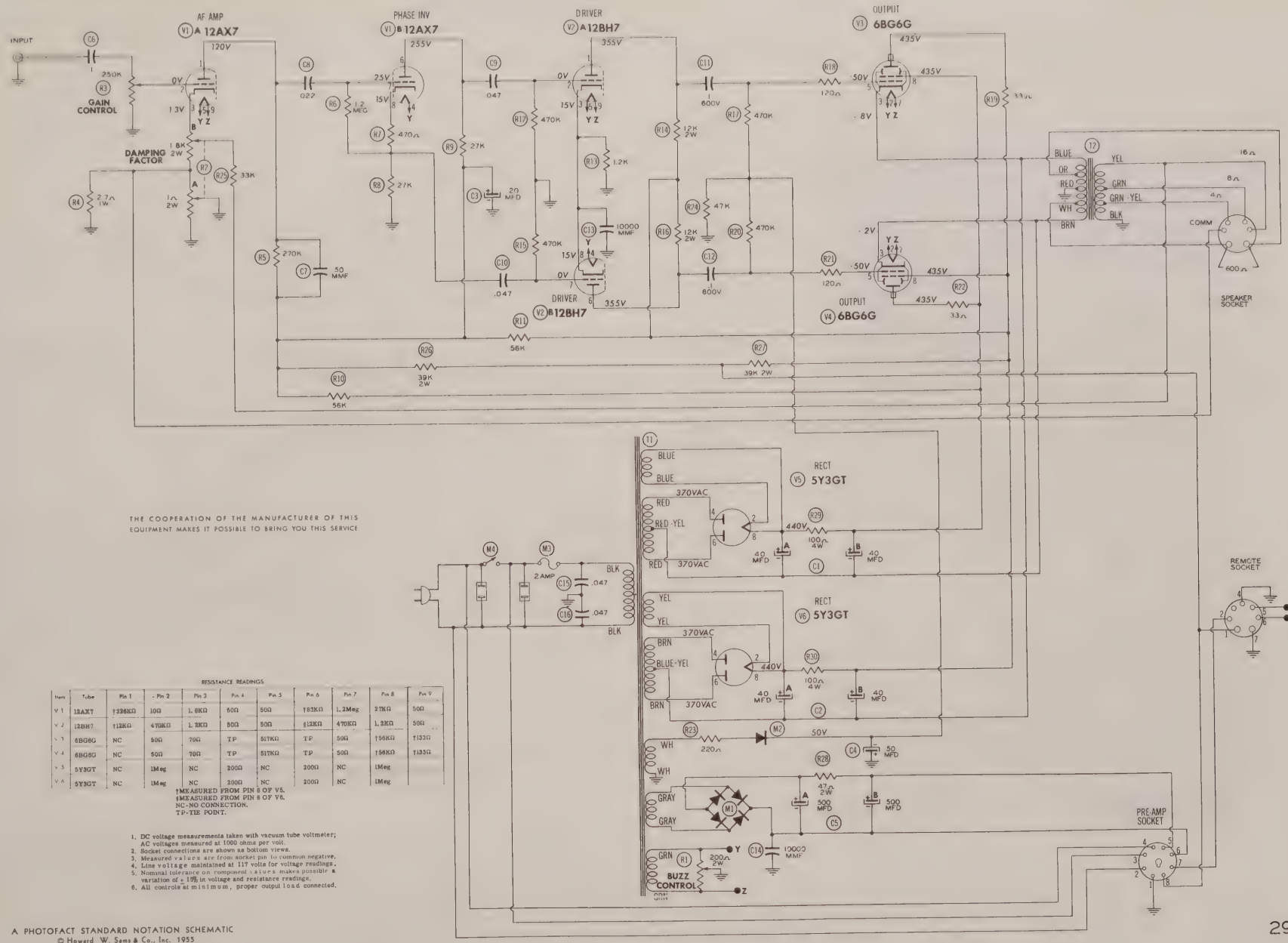

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†326KΩ	10Ω	1.8KΩ	50Ω	50Ω	†83KΩ	1.2Meg	27KΩ	50Ω
V2	12BH7	†12KΩ	470KΩ	1.2KΩ	50Ω	50Ω	§12KΩ	470KΩ	1.2KΩ	50Ω
V3	6BG6G	NC	50Ω	70Ω	TP	517KΩ	TP	50Ω	†56KΩ	†133Ω
V4	6BG6G	NC	50Ω	70Ω	TP	517KΩ	TP	50Ω	†56KΩ	†133Ω
V5	5Y3GT	NC	1Meg	NC	200Ω	NC	200Ω	NC	1Meg	
V6	5Y3GT	NC	1Meg	NC	200Ω	NC	200Ω	NC	1Meg	

†MEASURED FROM PIN 8 OF V5.
§MEASURED FROM PIN 8 OF V6.
NC-NO CONNECTION.
TP-TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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EMERSON
MODEL 814B (Ch. 120231-B)

EMERSON
MODEL 814B (Ch. 120231-B)

...RTY OF
...NSHIP
...T.
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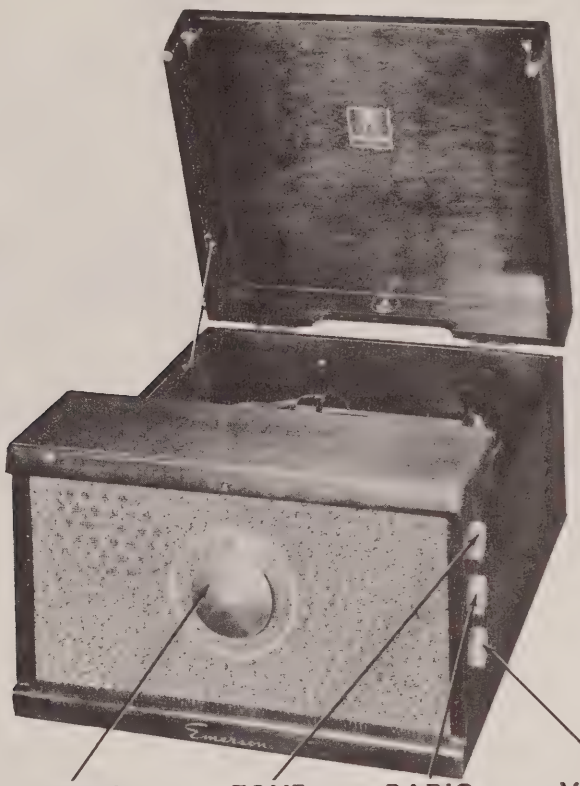

EMERSON
MODEL 814B (Ch. 120231-B)

TRADE NAME	Emerson Model 814B (Ch. 120231-B)
MANUFACTURER	Emerson Radio & Phono Corp., 111 Eighth Ave., New York, N. Y.
TYPE SET	AC Operated Radio-Phono Combination Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles
RATING	.25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.005MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum mod.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal.	"	A6	"

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT 819076-SEE SIMILAR V-M MODEL 950 IN PHOTOFACT SET #216-FOLDER #11 OR RECORD CHANGER MANUAL CM-5.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

EMERSON
Model 814B

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: EMERSON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det. -AVC-AF Amp	12AV6	12AV6	7BT	12AT6 used as alternate.
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: EMERSON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	50	150	925-278			TCD497	TDL-5030-150	FMD-301	
B	30	150							
C2	10000		928027	DD-103	811-01	DC511			
C3	.047	400	923554	DF-503		PT4147	IMP4-S47	3304147	
C4A	220		▲923028	PC-154	1408-01				
B	2000								
C	5000								
D	500								
E									
C5	.047	400	923554	DF-503		PT4147	IMP4-S47	3304147	
C6	.002	600	923723	D6-202	GP2-333-202	PT622	IMP6-D2	330622	
C7	.022	400	923524	DF-203		PT4122	IMP4-S22	3304122	
C8	.047	400	923554	DF-503		PT4147	IMP4-S47	3304147	
C9	.047	400	923554	DF-503		PT4147	IMP4-S47	3304147	

▲Items C4A, C4B, C4C, C4D, C4E, R7A, R7B and R7C combined in one unit. When replacing items separately, items C4E should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2Meg	½	390296	Q13-139	A47-2Meg-Z	B-76-S	U-55	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: EMERSON PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	22KΩ	½	340812	BTS-22K	
R3	220KΩ	½	351052	BTS-220K	
R4	120Ω	½	340272	BTS-120	
R5	3.3Meg	½	351332	BTS-3.3Meg	
R6	680KΩ	½		BTS-680K	

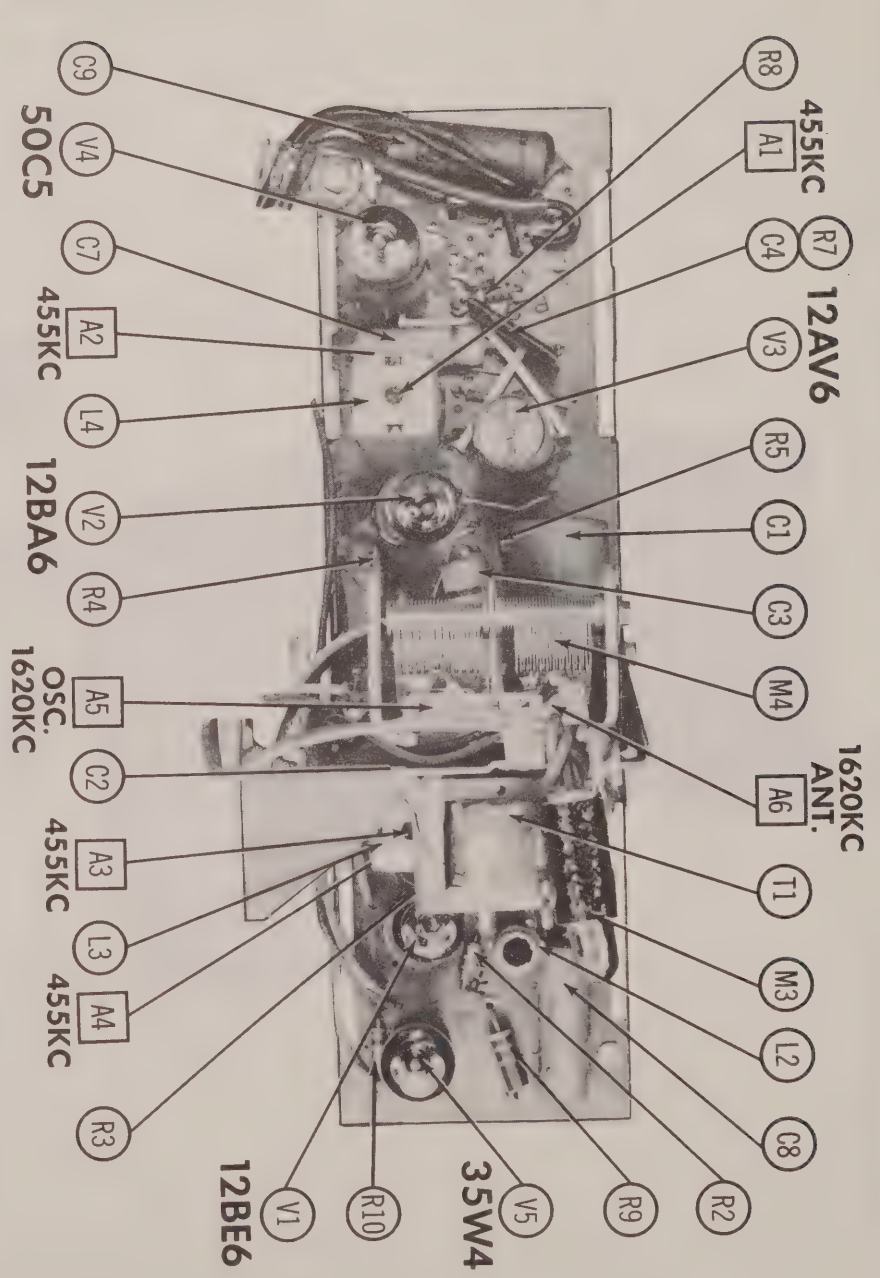
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: EMERSON PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R7A	6.8Meg	½	♦923028	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	
R8	150Ω	½	340292	BTS-150	
R9	1500Ω	1	380532	BTA-1500	
R10	18Ω	½	340072	BTS-18	

♦Items R7A, R7B, R7C, C4A, C4B, C4C, C4D, & C4E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: EMERSON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2.4KΩ	3.3Ω	734098	Z1101	A-3025	A-3332	26S58 ①	S-12X	① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	EMERSON PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	180184 180133 ①	4A07	① Alternate PM Speaker.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	EMERSON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.2Ω		700096				Includes cabinet back.
L2	Osc. coil	.7Ω	10Ω	716094				
L3	Input IF	16Ω	16Ω	720187	16-6758	BC-352	13-PC1	
L4	Output IF	16Ω	16Ω	720187	16-6758	BC-353	13-PC2	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	EMERSON PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	961011	ACD-C-J	A-1 and A-3	46T	O-1 or S-1 and O-3	

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

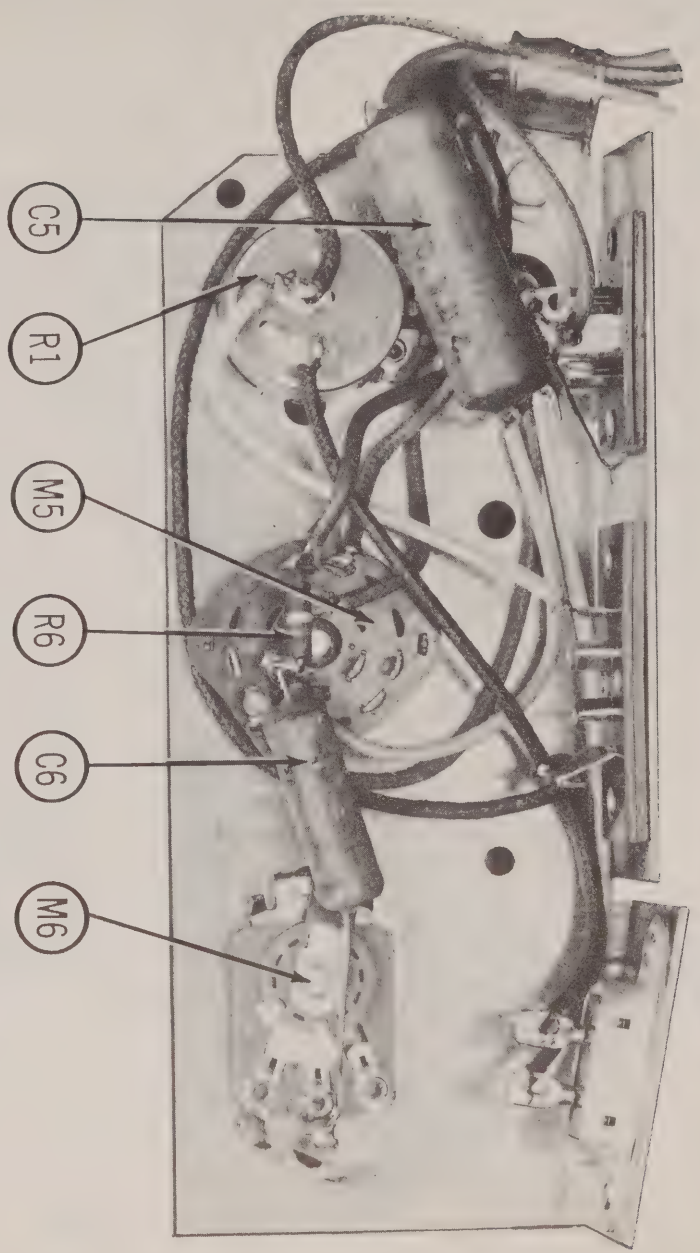
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	EMERSON PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2	961012 (78R. P.M. Needle)	*JP-32 or †JPS-32 or ♦JPS-32D and	*C-414 or †C-420 or ♦C-420D and	*W-31A or †W-31S or ♦W-31D and	* Metal † Jewel ♦ Diamond
M2	961013 (33 1/3 -45R. P.M. Needle)	*JP-32LP or †JPS-32LP or ♦JPS-32LPD	*A-415 or †A-418 or ♦A-418D	*W-31MGA or †W-31MGS or ♦W-31MGD	

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M3	Dial Light	807000	#47 Bayonet
M4	Tuning Cap.	900122	2 Gang (15-375MMF, 26-170MMF)
M5	Switch	510094	Radio-Phono
M6	Switch	510103	Tone
	Cabinet	140607	Includes Motor-Board
	Knob	460587	Tuning
	Knob	460569	Tone, Radio-Phono Switch, & On-Off-Volume
	Knob	960782	Record Changer-Speed Control
	Knob	960783	Record Changer-Cartridge Control

SUB-ASSEMBLY—REAR VIEW



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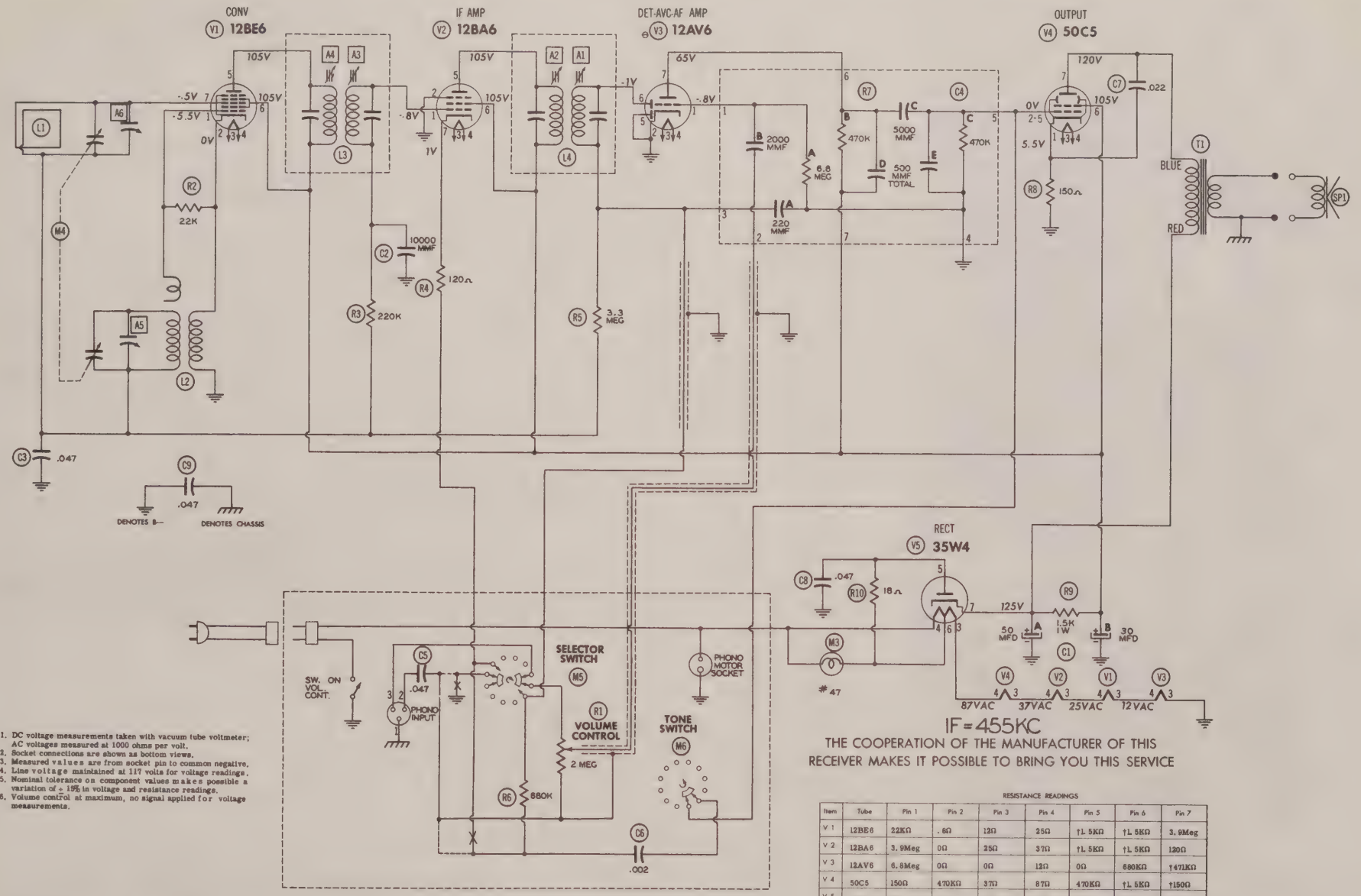
EMERSON
Model 814B



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.8Ω	12Ω	25Ω	†1.5KΩ	†1.5KΩ	3.9Meg
V 2	12BA6	3.9Meg	0Ω	25Ω	37Ω	†1.5KΩ	†1.5KΩ	120Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	0Ω	680KΩ	†471KΩ
V 4	50C5	150Ω	470KΩ	37Ω	87Ω	470KΩ	†1.5KΩ	†150Ω
V 5	35W4	NC	NC	87Ω	117Ω	130Ω	112Ω	1Meg

ALL MEASUREMENTS IN RADIO POSITION.
†MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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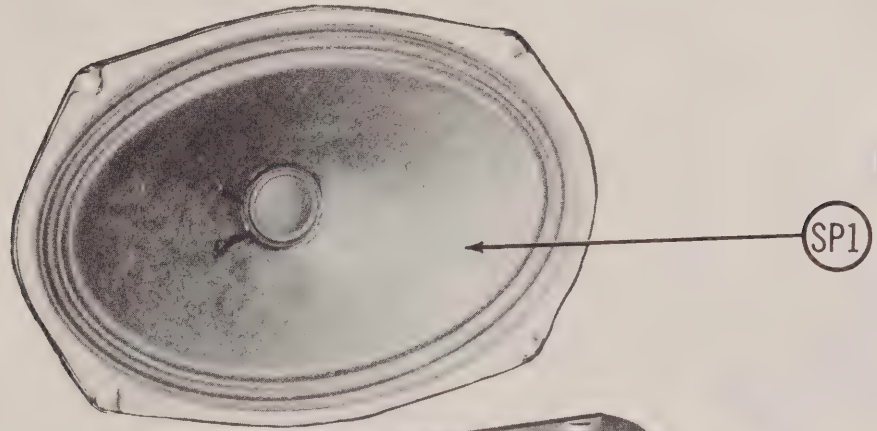

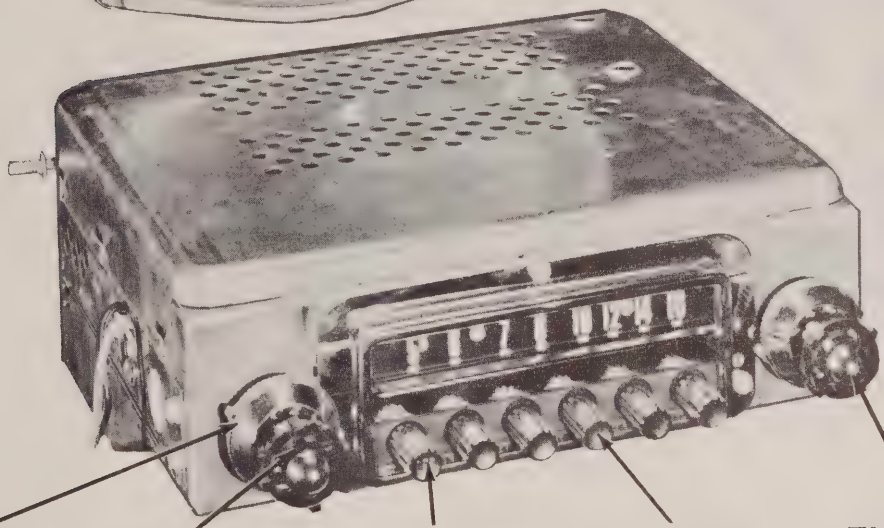

FORD MODELS
5MFS, 5MFS8 (FDH-18805-B)

TRADE NAME	Ford Models 5MFS, 5MFS8, (FDH-18805-B) (For 1955 Ford Sports Car)
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Illinois
TYPE SET	Battery Operated Custom-built AM Superheterodyne Automobile Receiver
TUBES (Eight)	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AV6 Det.-AVC-AF Amp., 6AV6 Phase Inv., (2) 6AQ5 Output, 6X4 Rectifier
POWER SUPPLY	6 Volt Storage Battery RATING 5.7 Amp. @ 6.3 Volts DC
TUNING RANGE- BROADCAST	540KC-1600KC

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp.	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amp.	6BA6	6BA6	7BK	
V4	Det. -AVC-AF Amp.	6AV6	6AV6	7BT	
V5	Phase Inv.	6AV6	6AV6	7BT	
V6	Audio Output	6AQ5	6AQ5	7BZ	
V7	Audio Output	6AQ5	6AQ5	7BZ	
V8	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■20	350	23A532094			FP330	TM-3029	T-470	
B	▲20	350							
C	20	25							
C2	120		21R114167						
C3	27		21R410089	TCZ-27					
C4	.1	200	8R121573	DF-104		PT401	IMP2-P1	330201	
C5	5.6		21R120545						
C6	43		21R115069	TCN-43	N750K-430				
C7	.05	400	8R121567	DF-503		PT415	IMP4-S5	330415	
C8	.1	200	8R121573	DF-104		PT401	IMP2-P1	330201	
C9	4.7		21R115955	TCZ-4R7	NPOA-4R7	ZT-5547			
C10	.01	400	8R121002	D6-103	GP3-333-103	PT411	IMP4-S1	330411	
C11	.02	400	8R121566	DF-203	817-02	PT412	IMP4-S2	330412	
C12	.0015	600	8K121844	D6-152	GP2L-152	UC-5215	IM6-D15	3306215	
C13	.02	200	8R121566	DF-203	817-02	PT412	IMP2-S2	330212	
C14	220		21R410115	DD-221	811-221	UC-5322		K-1322	
C15	.02	400	8121566	DF-203	817-02	PT412	IMP4-S2	330412	
C16	220		21R410115	DD-221	811-221	UC-5322		K-1322	
C17	.02	1000	8R121005			PT1612	CT10-S2		
C18	.5	100	8K122076			RF480	IMP2-P5	330205	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	18B532585	QJ-782A♦		F1-55	UF16L	Tone
B	250KΩ	½				R4-37	UR254-T753	Volume tapped 75KΩ
C	Bushing					AK-27	EB214	
R2	150Ω	2	18K512520		39-150			Sensitivity (Wire-Wound)

♦CONCENTRIKIT EQUIVALENT; K-8 KIT, BASE ELEMENTS AND SHAFTS, B11-137, P16-023 (Panel)
B18-130X, R1-105 (Rear)
S-11 Bushing *

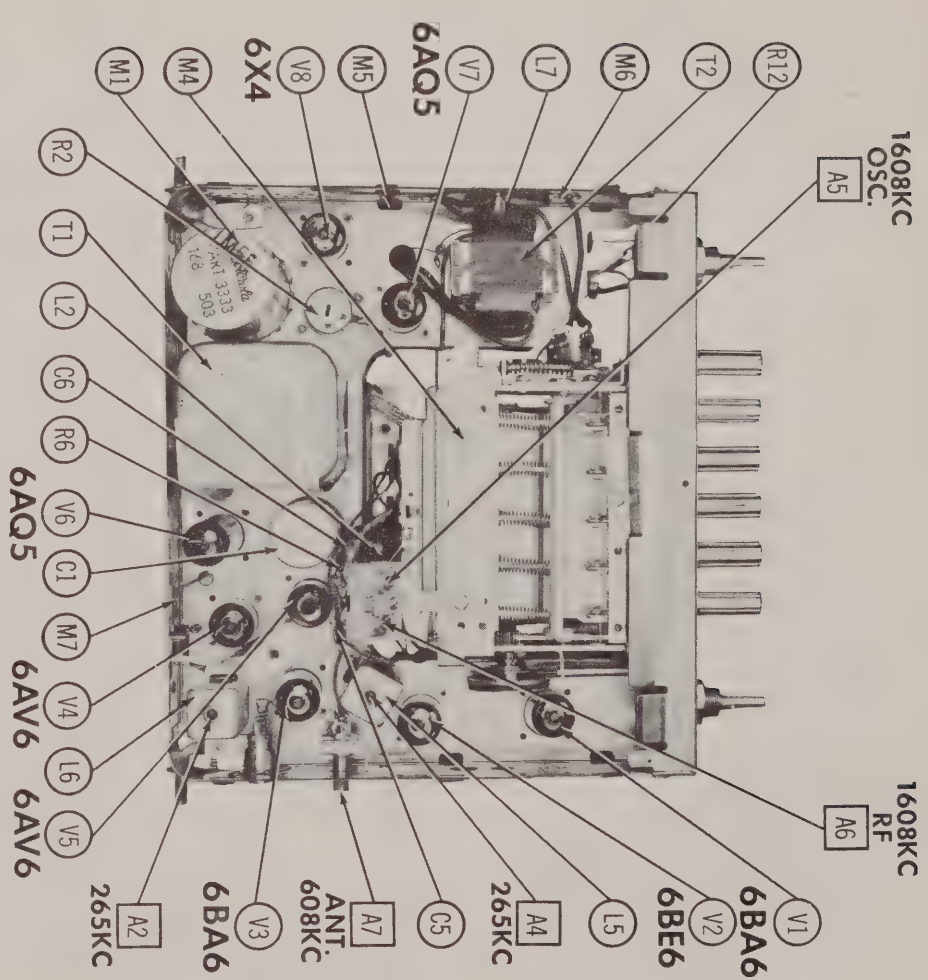
*FILE "FLAT" ON BUSHING AFTER INSTALLATION OF CONTROL.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R3	470KΩ	½	6R6032	BTS-470K	
R4	10KΩ	1	6R6430	BTA-10K	
R5	220KΩ	½	6R6015	BTS-220K	
R6	47KΩ	½	6R6056	BTS-47K	
R7	2.2Meg	½	6R3927	BTS-2.2Meg	
R8	15KΩ	2	6R5732	BTB-15K	
R9	1Meg	½	6R6004	BTS-1Meg	
R10	2.2Meg	½	6R3927	BTS-2.2Meg	
R11	4.7Meg	½	6R2122	BTS-4.7Meg	
R12	18KΩ	½	6R5591	BTS-18K	
R13	47KΩ	½	6R6056	BTS-47K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R14	1Meg	½	6R6004	BTS-1Meg	
R15	47Ω	½	6R5550	BTS-47	
R16	12KΩ	½	6R6394	BTS-12K	
R17	1Meg	½	6R6004	BTS-1Meg	
R18	2200Ω	½	6R6069	BTS-2200	
R19	330KΩ	½	6R6014	BTS-330K	
R20	150Ω	1	6R6330	BTA-150	
R21	330KΩ	½	6R6014	BTS-330K	
R22	2200Ω	2	6R476130	BTB-2200	
R23	1500Ω	½	6R6038	BTS-1500	
R24	56Ω	½	6R5614	BTS-56	
R25	56Ω	½	6R5614	BTS-56	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
T1	6.3VCT 3.3A	580VCT .068A			25C532583					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	TKO CT	4.1Ω	24K532582-B	21004 ①	A-2900 ①	A-3850 ①	22547 ①	S-51X	

SPEAKER

ITEM No.	RATINGS				REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.		MOTOROLA PART No.	QUAM PART No.	
SP1	6" x 9"	PM	4.1Ω		50C530699	6JA2	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Antenna coil	1Ω		24B510175				
L2	IF trap			24K512088				
L3	RF coil	1Ω		24K510176				
L4	Osc. coil	1.1Ω	3.3Ω	24B512112				
L5	Input IF	46Ω	46Ω	24B532152	16-6752	BC-350	12-H1	
L6	Output IF	44Ω	44Ω	24K532153	16-6754	BC-354	12-H6	
L7	Fil. choke	.3Ω		24A532586				127 Microhenries
L8	Vib. hash choke	0Ω		24A532093				33 Microhenries
L9	Fil. choke	0Ω		24K532583				1 Microhenries

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				MOTOROLA PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	115Ω	48B3333	5342	903M	5342	

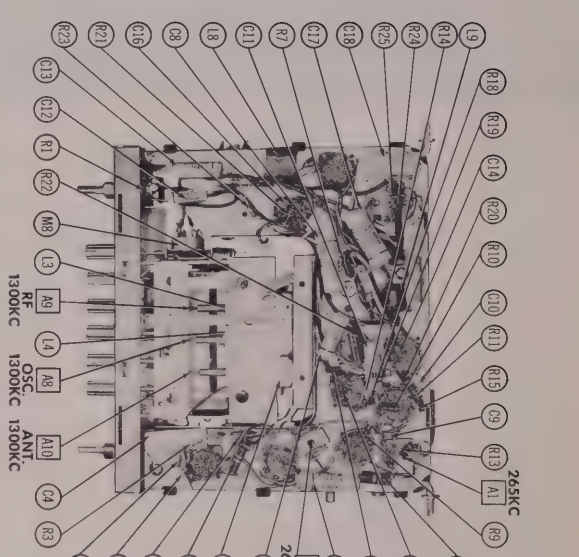
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	14A 32V	65K12894	9K532820	307014 (SFE14)	155014	SFE14	HR1

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Dial Light	65X10867	#44
M4	Tuner	77D532539	Permeability-Complete
M5	Spark Plate	64K530177	"A" Lead
M6	Spark Plate	64A530178	Dial Light Lead
M7	Spark Plate	64K530177	Speaker
M8	Switch	40B532994	On-Off (DPST)
A5, A6	Trimmer Cap.	20K532549	Dual Trimmer: Osc. (430-510MMF) & RF (7.5-9MMF) Unit also consists of 2 (47MMF) & 300MMF fixed capacities.
A7	Trimmer Cap.	20D530768	Ant. (5-80MMF)
	Knob	36B51457	Tone & Dummy
	Knob	36A53001	On-Off-Volume & Tuning
	Push Button Assy.	38B532733	Off
	Push Button & Screw Assy.	38K532548	Station Selectors
	Dial Scale	34B533223	
	Dial Background	34K533222	
	Pointer Assy.	52K532064	

CHASSIS—BOTTOM VIEW



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Set tone control to "high."
Set volume to maximum.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENE..ATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	2651.5 (400% Mod.)	High frequency end stop.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
*2.	Fig. 1	Thru dummy antenna to antenna receptacle	1608KC	"	"	A5, A6, A7	"
3.	"	"	1300KC	Set 21/64 from high frequency end stop.	"	A8, A9, A10	Adjust for maximum output. Use alignment tool shown in Fig. 2. Repeat steps 3 & 4 for further increase. Cement cores in place.
4.	"	"	1608KC	High frequency end stop	"		
5.	"	"	600KC (5MV output)	Tune to 600KC signal.	"	Sensitivity control	Adjust for 1.79 volt output (1 watt).
6.				Weak station around 1400KC			With receiver installed, and antenna fully extended, adjust A7 for maximum volume.

*Alignment of tuner not necessary unless there has been tampering or replacement of components. If so, back tuner cores 1 3/8" out of coils to eliminate trimmer effect.

POINTER CALIBRATION

Tune receiver to 1400KC generated signal. Rotate pointer, adjusting cam (see picture) until pointer coincides with 1400KC on dial. Be sure cam eccentric is facing rear of tuner so that it will not jump out of guide slot when turning to high end of dial by push button.

PUSH BUTTON ADJUSTMENT

1. Allow 15 minutes warmup period.
2. To loosen push buttons, turn one full turn counter-clockwise with finger.
3. Tune to desired station manually.
4. Press push button firmly and tighten with fingers, one full turn clockwise.
5. Repeat on remaining push buttons.

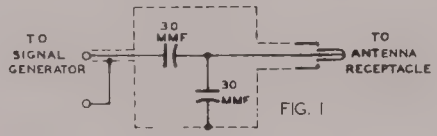


FIG. 1

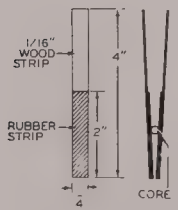


FIG 2

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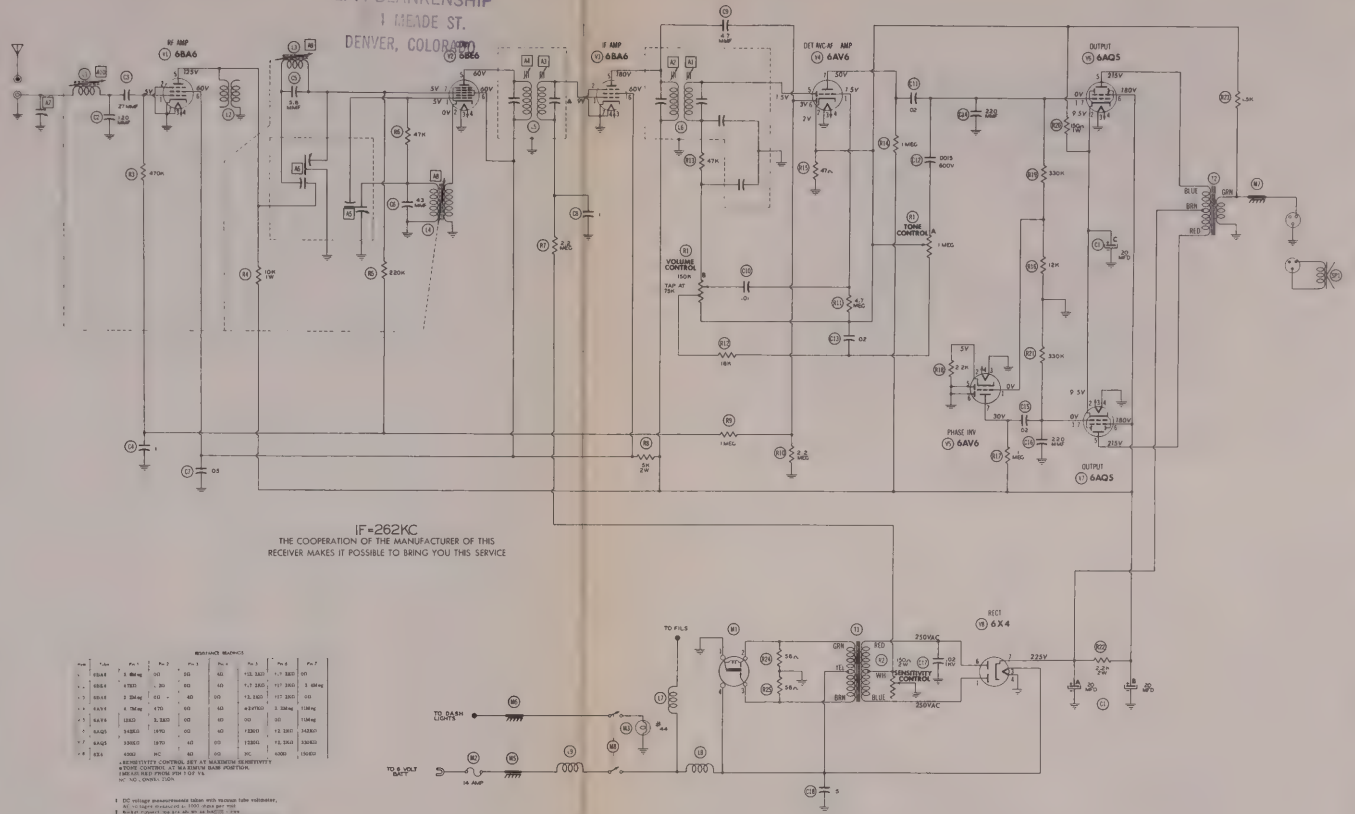

IF=262KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	6BA6	1.8Meg	180	820	60	12.2KΩ	1.7 KΩ	65
V2	6BA6	470Ω	1.2K	820	60	1.7 KΩ	117 KΩ	1.8Meg
V3	6BA6	2.2Meg	60	60	60	12.2KΩ	117 KΩ	60
V4	6AV6	4.7Meg	470	60	60	62KΩ	2.2Meg	1.1Meg
V5	6AV6	120Ω	2.2KΩ	60	60	60	30	1.1Meg
V6	6AQ5	340Ω	1970	60	60	120Ω	12.2KΩ	342KΩ
V7	6AQ5	330Ω	1870	60	60	120Ω	12.2KΩ	330KΩ
V8	6X4	400Ω	NC	60	60	NC	4000	150KΩ

• SENSITIVITY CONTROL SET AT MAXIMUM SENSITIVITY
• TONE CONTROL SET AT MAXIMUM BASS POSITION.
TWO KCS. KEY PRESS FOR 1 OF V4.
NC - NO CONNECTION

1 DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt
2 Power input to the receiver is 60 watts at 117 volts AC
3 Measured from chassis to the socket pin terminal with no signal input
4 Resistance measurements taken with power off and speaker disconnected
5 Normal tolerance on components ±10% unless otherwise specified
6 Voltage readings are with a 20,000 ohms per volt meter. Readings may vary ±10% or voltage and resistance readings
7 Voltage readings are measured to ground, no signal applied. Set volume control at maximum

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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PHOTOFACT* Folder

*TRADE MARK

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MODEL 21T17

GENERAL ELECTRIC MODELS 17T14, 17T16, 21C102, 21C238, 21T17, 21T18, 21T28 ("K" Line)

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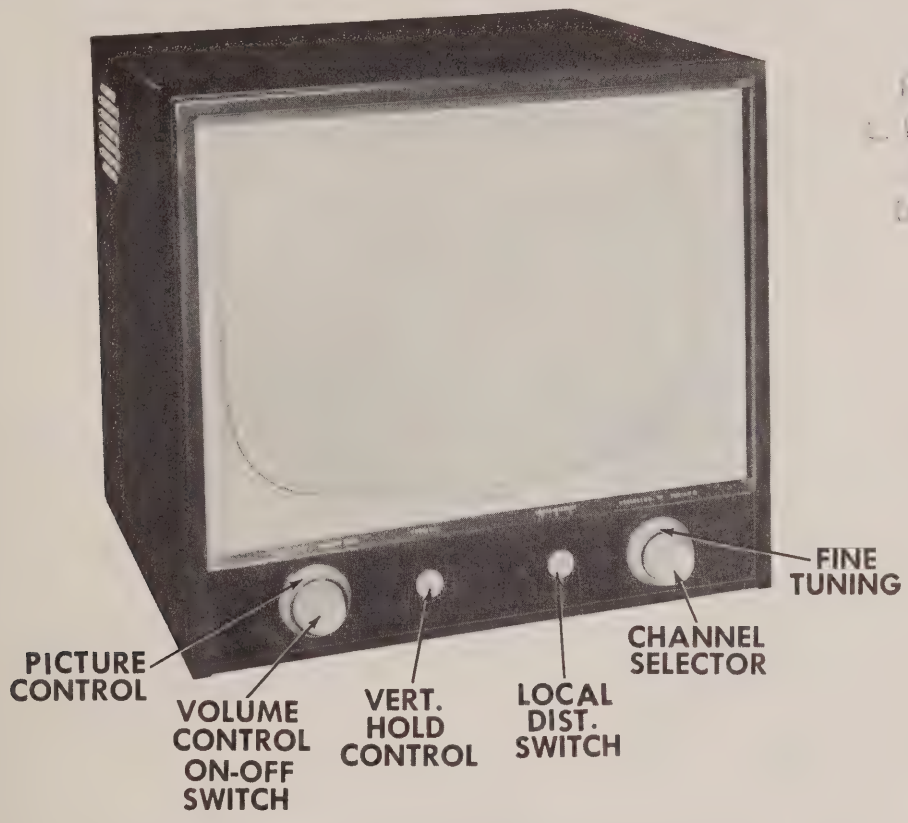

GENERAL ELECTRIC MODEL 21T17

TRADE NAME	General Electric Models 17T14, 17T16, 21C102, 21C238, 21T17, 21T18, 21T28 ("K" Line) UHF Model Numbers Bear Suffix "UHF"
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	Television Receiver
TUBES	Eighteen
POWER SUPPLY	110-120 Volts AC-60 RATING 1.44 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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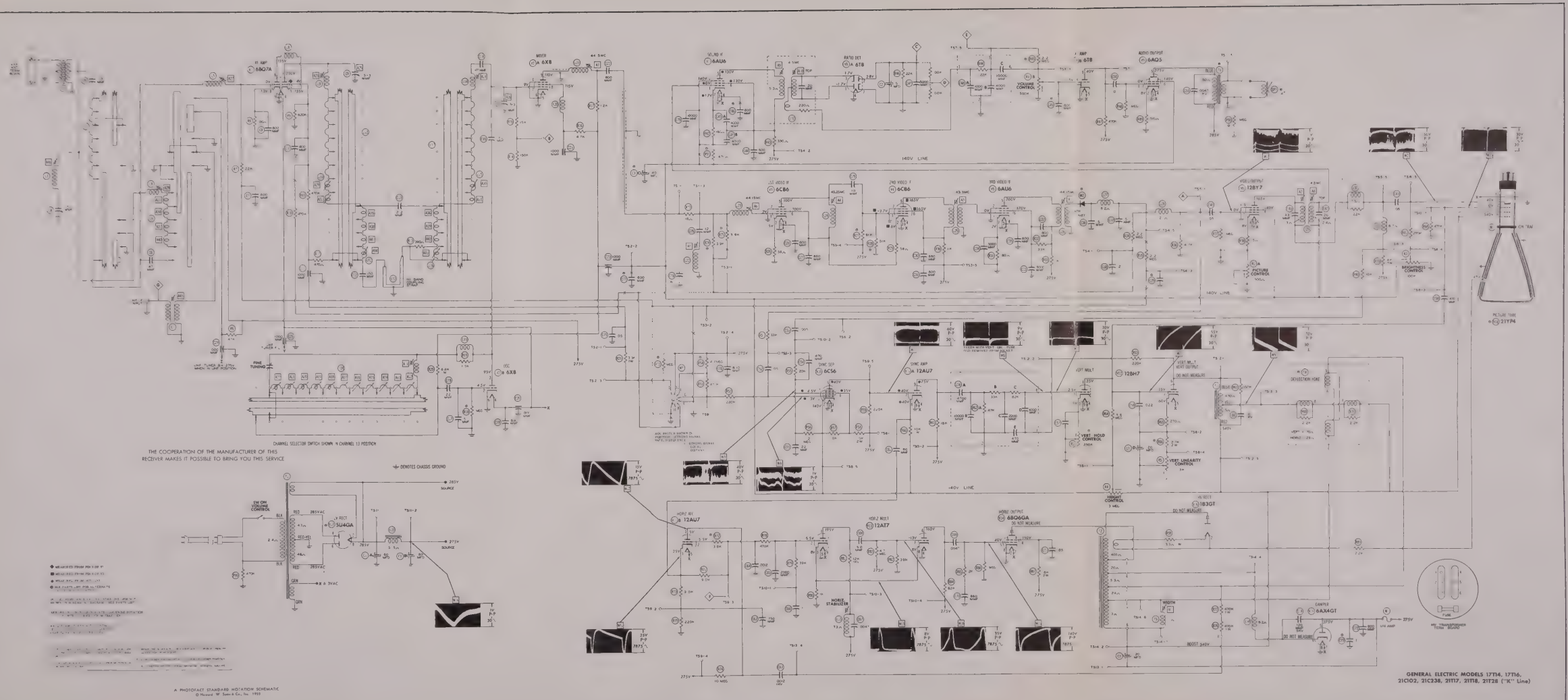
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THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
CHANNEL SELECTION SWITCH SHOWN IN CHANNEL 13 POSITION
DENOTES CHASSIS GROUND
140V LINE
A PHOTOFACT STANDARD NOTATION SCHEMATIC

GENERAL ELECTRIC MODELS 17T14, 17T16, 21C102, 21C238, 21T17, 21T18, 21T28 ("K" Line)

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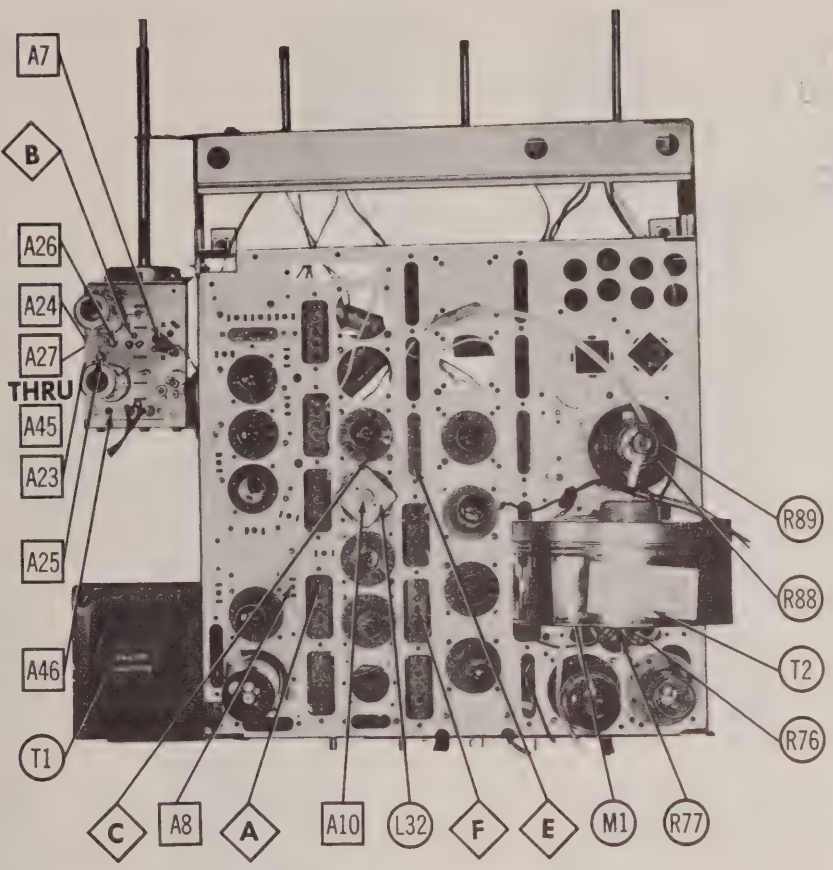
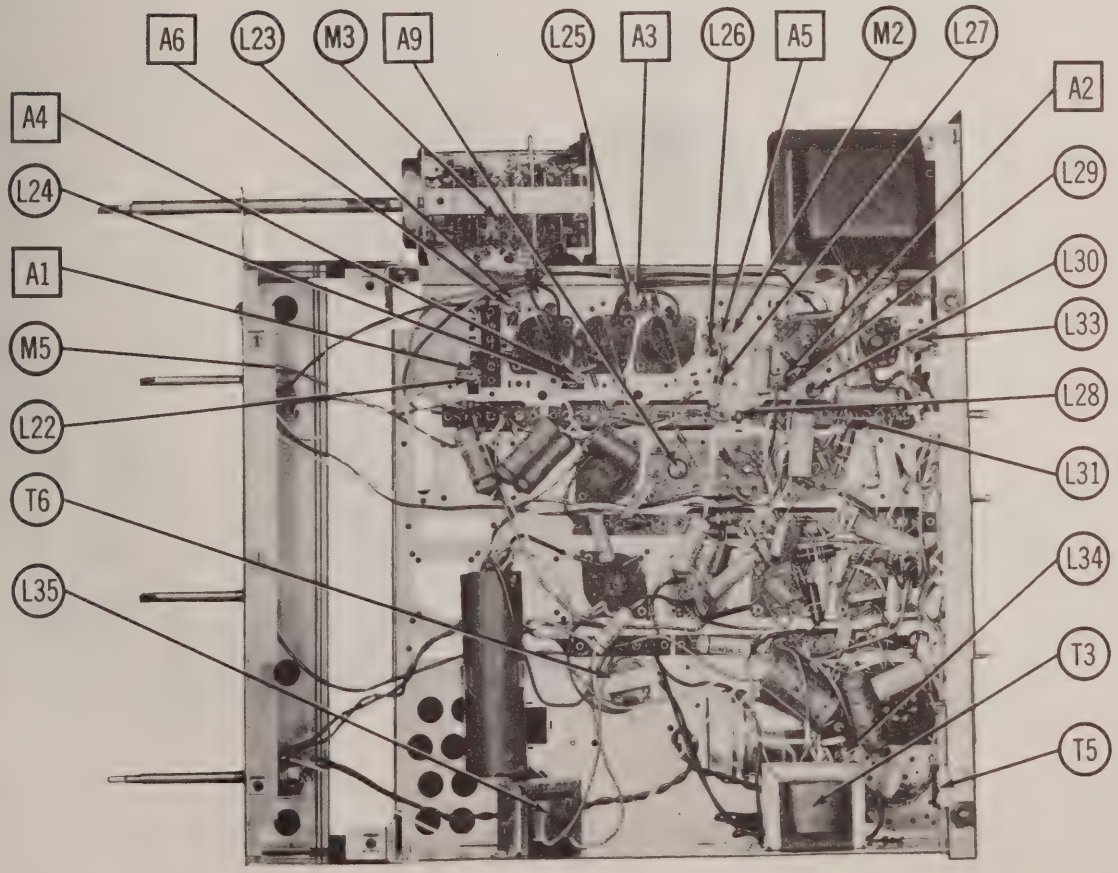
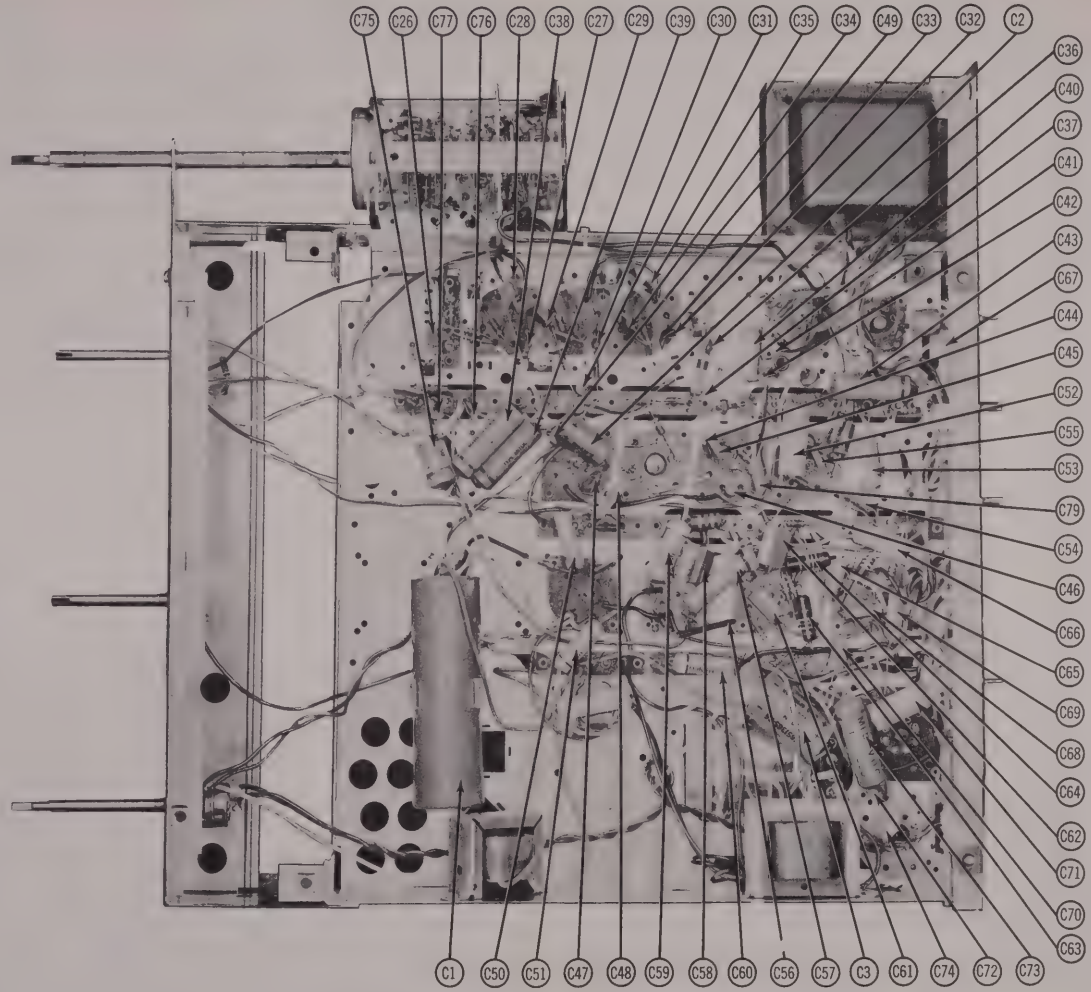


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



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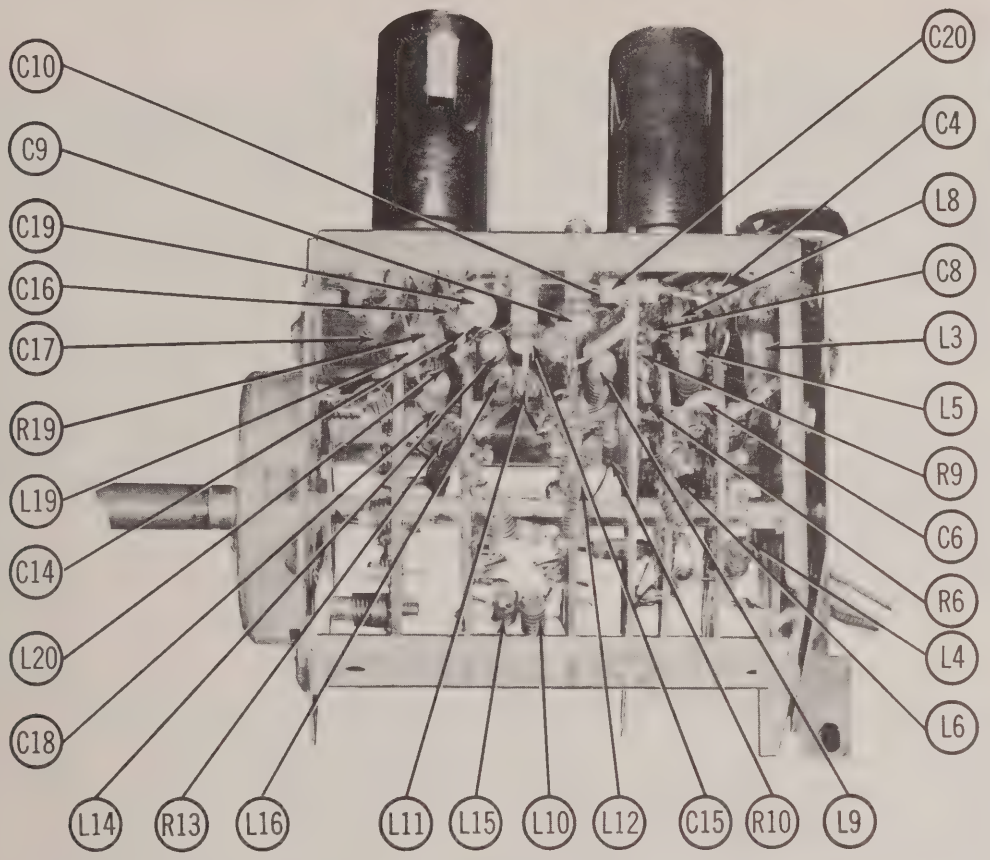
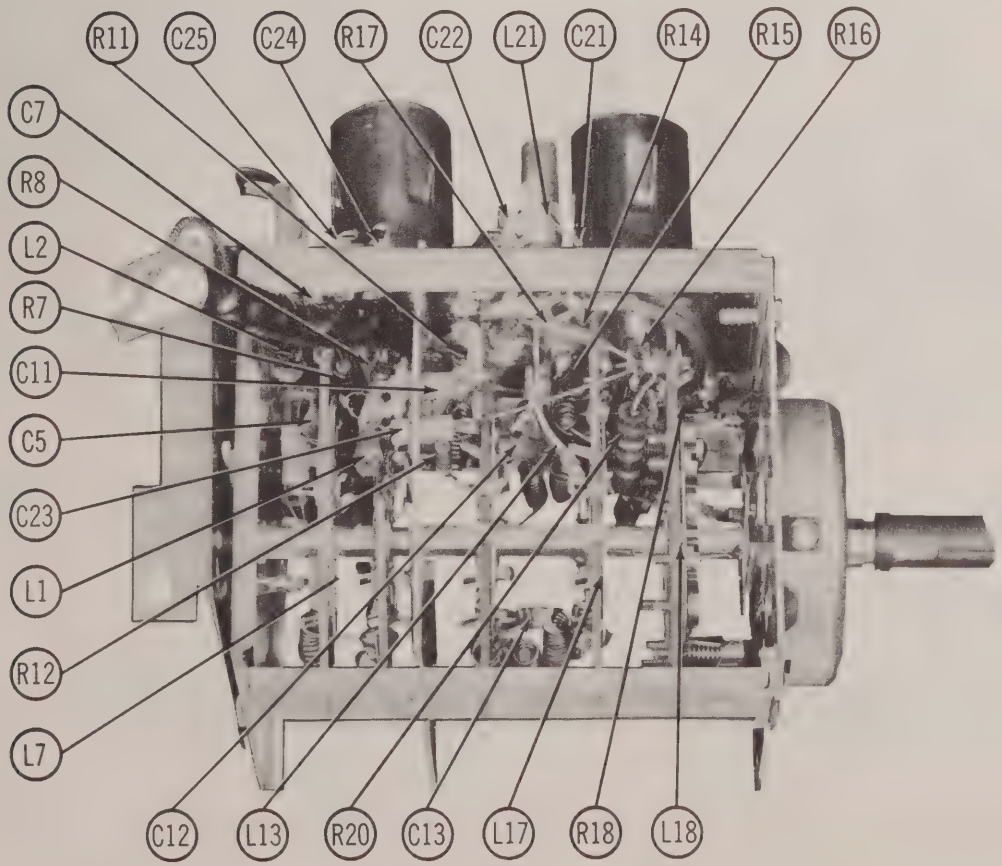


RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hasard may be eliminated by removing the horizontal output tube (6BQ8/V4) from its socket. Do not remove the horizontal multivibrator tube (V13) to disable the high voltage. Allow a 20 minute warmup period for receiver and test equipment.

TRAP ALIGNMENT

Turn the volume control maximum counter clockwise. Set the local-distance switch to #3 position. Turn the contrast control maximum clockwise.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to point (B). Low side to chassis.	Not used	47.25MC (600%Mod)	11, 12 or 13	Vert. Amp. to pin 11 (cathode) of picture tube. Low side to chassis.	A1	Adjust for MINIMUM 400% indication on scope. If necessary, use maximum scope gain.
2.	"	High side to point (A). Low side to chassis.	"	4.5MC (400%Mod)	"	Vert. Amp. thru detector (Fig.1) to pin 11 (cathode) of picture tube. Low side to chassis.	A2	"

VIDEO IF ALIGNMENT

Turn the contrast control to minimum contrast position.
If during adjustment two peaks occur the correct peak may be obtained by turning the slug fully counter clockwise, then clockwise until the first peak appears again. Connect the negative lead of a 3 volt bias supply to the ungrounded side of C38. Connect positive lead to chassis. If the receiver is known to be only slightly misaligned, omit "Video IF Alignment" and continue alignment as outlined under "Overall Video IF Response Check". Use only enough signal generator output to provide useable indication on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
3.	.001MFD	High side to point (B). Low side to chassis.	43.3MC (Unmod)	11, 12 or 13	DC probe thru 10KΩ to point (A). Common to chassis.	A3	Adjust for maximum deflection.
4.	"	"	45.25MC	"	"	A4	"
5.	"	"	44.15MC	"	"	A5, A6, A7	"

OVERALL VIDEO IF RESPONSE CHECK

The channel selector switch should be set to channel 11, 12 or 13. Select the channel (11, 12 or 13) on which the response curve does not change shape when turning the fine tuning control.
Calibrate oscilloscope so that .75 volts peak to peak produces 2 inches of vertical deflection. Leave bias connected as under "Video IF Alignment."
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.001MFD	High side to point (B). Low side to chassis.	44MC (30MC Swp)	41.25MC 43.5MC 45.0MC 45.75MC 47.25MC	11, 12 or 13	Vert. amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig.3. Adjust A3 thru A7 for correct response curve with proper position of markers. Adjust A3 for position of 45.75MC marker and maximum amplitude of low frequency side of response curve. Adjust A4 for positioning of 45.75MC marker. Adjust A5 and A6 for correct tilt at peak region of response curve. Adjust A7 for width of peak region of response curve. Increase the sweep generator output and check 47.25MC and 41.25MC trap markers for correct position of response curve (Fig.3).

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (C), to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.
If a signal generator providing a 4.5MC signal of crystal accuracy is not available, restore the receiver to normal operating condition and tune in a TV station. Connect VTVM and adjust A8, A9 and A10 as in steps 7 and 8.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any unused channel	DC probe to point (D). Common to chassis.	A8, A9	Adjust for maximum deflection.
8.	"	"	"	"	DC probe to point (C). Common to point (D).	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 7 and 8.

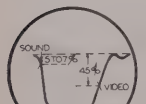


FIG. 6

FIG. 7

FIG. 8

FIG. 9

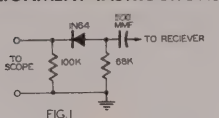


FIG. 1

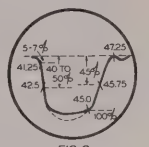


FIG. 2

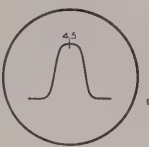


FIG. 3

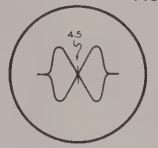
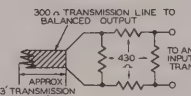
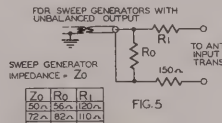


FIG. 4





Z0	R0	R1
50Ω	56Ω	120Ω
72Ω	82Ω	110Ω
92Ω	110Ω	100Ω

FIG. 5

R0 = TERMINATING IMPEDANCE

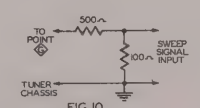


FIG. 10

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 80% modulation and 450KC sweep. Use 130% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any unused channel	Vert. Amp. to point (D). Low side to chassis.	A8, A9	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 7.
8.	"	"	"	"	"	Vert. Amp. to point (D). Low side to chassis.	A10	Reconnect stabilizing capacitor C2. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

VHF OSCILLATOR ALIGNMENT

Connect bias as under "Video IF Alignment."
Set the fine tuning control two-thirds turn from its fully counter clockwise position and leave it in this position during entire oscillator alignment.
Remove the 300Ω transmission line from tuner input terminals.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Fig. 5	Thru dummy (Fig.5) across primary of antenna input coil (L2).	213MC (30MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A11	Adjust to place video marker at 45% on response curve as shown in Fig. 6. Sound marker should be between 5 and 7 percent on response curve.
			207MC (30MC Swp)	205.25MC 209.75MC	12		A12	
			201MC (30MC Swp)	198.25MC 203.75MC	11		A13	
			195MC (30MC Swp)	193.25MC 197.75MC	10		A14	
			189MC (30MC Swp)	187.25MC 191.75MC	9		A15	
			183MC (30MC Swp)	181.25MC 185.75MC	8		A16	
			177MC (30MC Swp)	175.25MC 179.75MC	7		A17	
			85MC (30MC Swp)	83.25MC 87.75MC	6		A18	
			79MC (30MC Swp)	77.25MC 81.75MC	5		A19	
			91MC (30MC Swp)	87.25MC 71.75MC	4		A20	
			83MC (30MC Swp)	81.25MC 65.75MC	3		A21	
			97MC (30MC Swp)	95.25MC 99.75MC	2		A22	

VHF RF AND MIXER ALIGNMENT

Remove the 300Ω transmission line from tuner input terminals.
Set the local-distance switch to #"1" position.
Connect bias as under "Video IF Alignment."
If L20, L10 or L15 requires adjustment (normally adjustment is not required), the tuner cover must be removed and replaced before and after each adjustment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Fig. 5	Thru dummy (Fig.5) across primary of antenna input coil (L2).	213MC (55MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (D). Low side to tuner chassis.	A23, A24	Adjust for response of maximum amplitude and symmetry similar to Fig. 7. If tilt exceeds 15% it may be necessary to compress or expand coil turns of L20. Use insulated tool to prevent shorting B+.
11.	"	"	177MC (55MC Swp)	175.25MC 179.75MC	7	"	A25, A26, A27	Adjust for response curve similar to Fig.7. A25 and A26 affect bandwidth. Adjust A27 for maximum gain and MINIMUM tilt. If necessary, reposition L20 and L15 (coils whose adjustment is A29 and A30) to obtain desired coupling.
12.	"	"	207MC (55MC Swp)	205.25MC 209.75MC	12	"		Check each channel for response similar to Fig. 7. If not within limits on any high band channel, make compromise adjustments of A23 thru A27 with channel switch set to that channel. Recheck all other high band channels to see that they have not been seriously affected.
			201MC (55MC Swp)	198.25MC 203.75MC	11			
			195MC (55MC Swp)	193.25MC 197.75MC	10			
			189MC (55MC Swp)	187.25MC 191.75MC	9			
			183MC (55MC Swp)	181.25MC 185.75MC	8			
13.	"	"	85MC (55MC Swp)	83.25MC 87.75MC	6	"	A28, A29, A30	Adjust for maximum amplitude flat-topped response curve similar to Fig. 8.
14.	"	"	79MC (55MC Swp)	77.25MC 81.75MC	5	"	A31, A32, A33	Check for response similar to Fig. 8. If necessary, adjust by compressing or expanding coil turns to obtain response similar to Fig. 8.
15.	"	"	69MC (55MC Swp)	67.25MC 71.75MC	4	"	A34, A35, A36	"
16.	"	"	63MC (55MC Swp)	61.25MC 65.75MC	3	"	A37, A38, A39	"
17.	"	"	57MC (55MC Swp)	55.25MC 59.75MC	2	"	A40, A41, A42	"

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ALIGNMENT INSTRUCTIONS (cont)

UHF 40MC ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the VHF tuner AGC terminal (white wire). Connect positive lead to tuner chassis.
Switch the channel selector to UHF position.
Remove shield from L21 and disconnect IF output link from L21.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
18.	Fig. 10	High side thru network (Fig.10) to point (G). Low side to chassis.	620MC (20MC Swp)	40.5MC 45.75MC	UHF position (Any)	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A43, A44, A45	Adjust for response similar to Fig. 9. Adjust A43 for maximum gain and correct position of 40.5MC marker. Adjust A44 for maximum gain and correct position of 45.75 MC marker. Adjust A45 for maximum amplitude and MINIMUM tilt. Replace shield over L21 and reconnect IF output link.

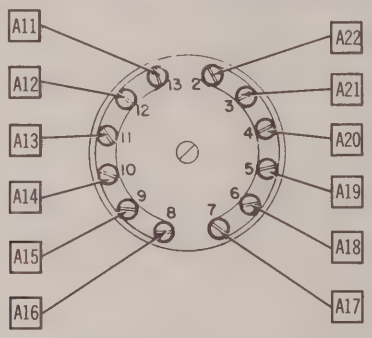
VHF IF TRAP ALIGNMENT

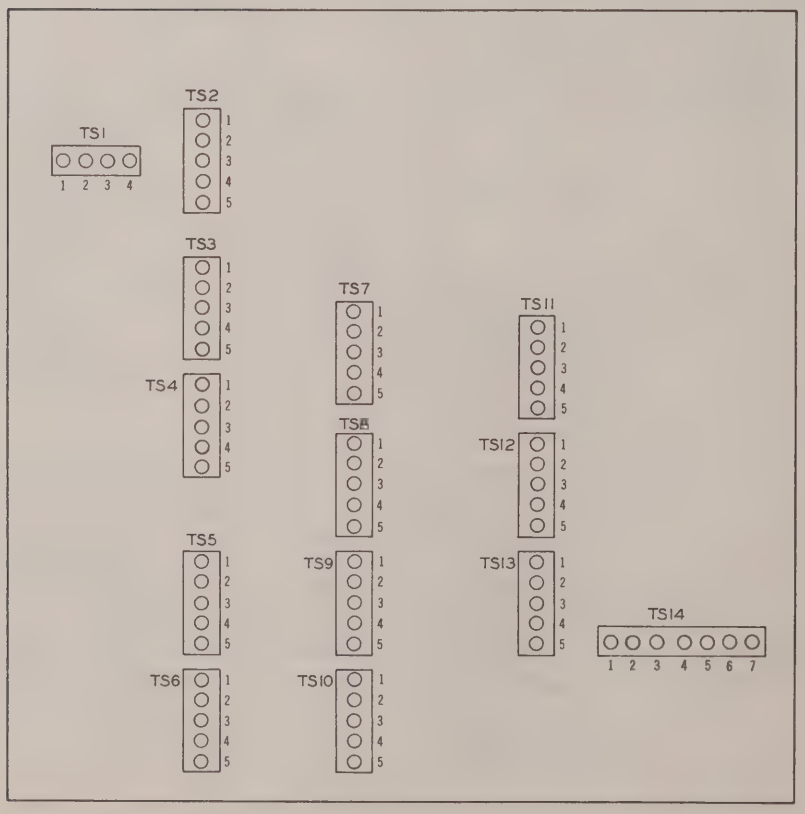
The IF trap (A46) may be aligned by tuning in the station on which the interference occurs and adjusting A46 for minimum interference in the picture. Be careful not to adjust A46 so that it attenuates at channel 2 response.
If the frequency of the interfering signal is known, the trap may be aligned as in step 19.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
19.	Fig. 5	Thru dummy (Fig.5) across VHF antenna terminals	44MC (10MC Swp)	Set to freq. of interfering signal. Normally adjusted at 43.5MC	2	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A46	Connect bias as under "UHF 40MC Alignment". Adjust for MINIMUM marker amplitude. Remove bias and all test equipment. Replace V14 in its socket.

UHF TUNER ALIGNMENT

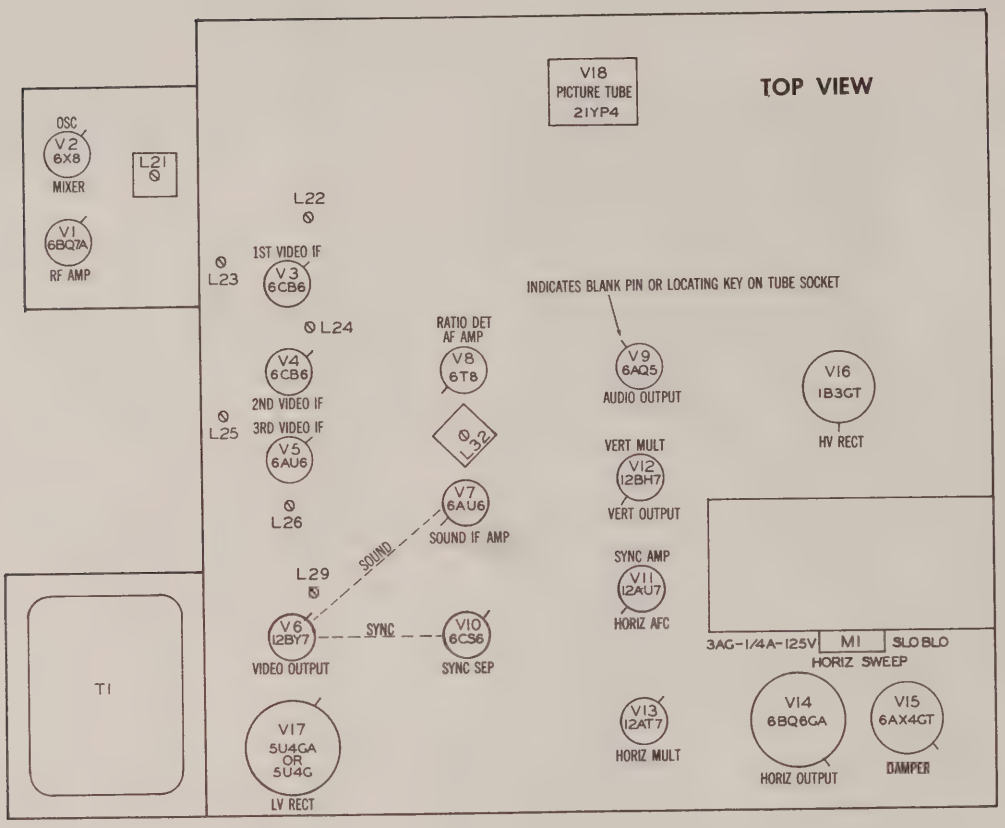
The UHF tuner has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.





TERMINAL LOCATION CHART

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V17

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V18
Has pic, no sound - V7, V8, V9

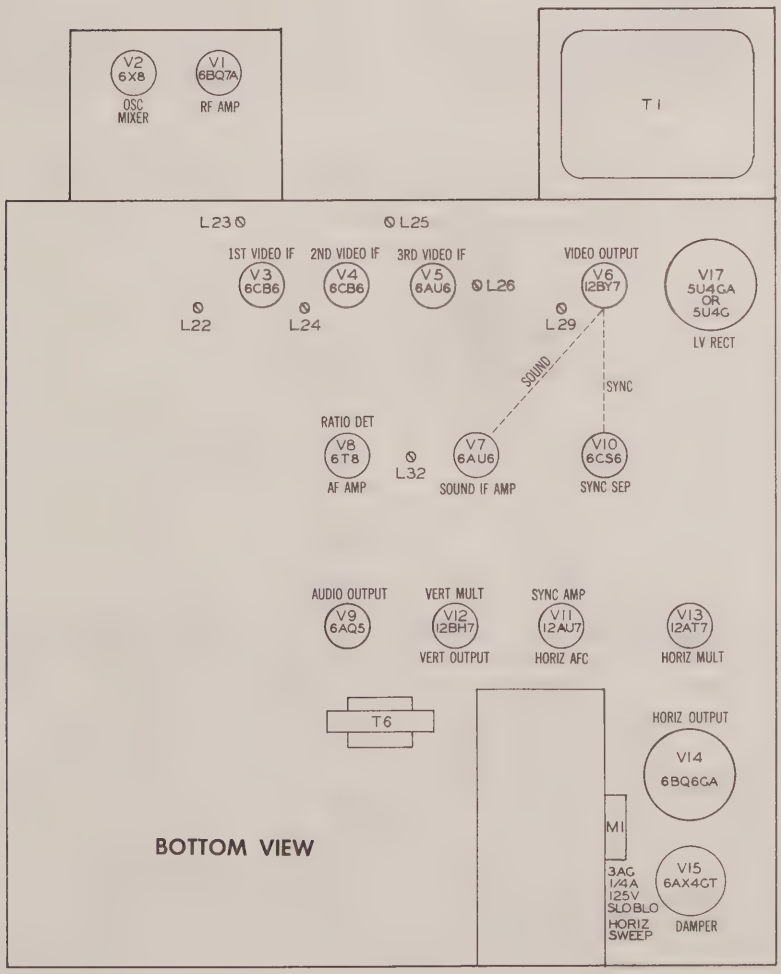
SYNC FAILURE
No vert. sync - V11, V12
No horiz. sync - V11, V13
No vert. or horiz. sync - V10, V11

SWEEP FAILURE
No raster, has sound - V13, V14, V15, V16, V18, Fuse (M1)
No vertical deflection - V12
Poor vert. linearity or foldover - V12
Poor horiz. linearity or foldover - V13, V14, V15
Narrow picture - V13, V14, V15, V16, V17
Vert. off freq. - V11, V12
Horiz. off freq. - V11, V13

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	†3. 8KΩ	320KΩ	Inf.	. 1Ω	0Ω	Inf.	22KΩ	100Ω	0Ω
V 2	6X8	0Ω	1Meg	■6. 8KΩ	. 1Ω	0Ω	0Ω	165KΩ	■4. 7KΩ	■1. 2KΩ
V 3	6CB6	2. 2Meg	56Ω	0Ω	. 1Ω	▲56Ω	▲56Ω	0Ω		
V 4	6CB6	50KΩ	Inf.	0Ω	. 1Ω	†1KΩ	†1KΩ	0Ω		
V 5	6AU6	. 1Ω	0Ω	0Ω	. 1Ω	†1KΩ	†34KΩ	180Ω		
V 6	12BY7	80Ω	1Meg	0Ω	0Ω	0Ω	. 1Ω	†4KΩ	60KΩ	0Ω
V 7	6AU6	60KΩ	60KΩ	0Ω	. 1Ω	†400Ω	†400Ω	■180Ω		
V 8	6T8	2. 7Meg	22KΩ	2. 7Meg	0Ω	. 1Ω	NC	0Ω	350KΩ	†470KΩ
V 9	6AQ5	1Meg	510Ω	0Ω	. 1Ω	†800Ω	60KΩ	1Meg		
V 10	6CS6	5Meg	60KΩ	0Ω	. 1Ω	†220KΩ	†10KΩ	1. 2Meg		
V 11	12AU7	†260KΩ	†2Meg	†1Meg	. 1Ω	. 1Ω	†18KΩ	†220KΩ	■10KΩ	0Ω
V 12	12BH7	▲7Meg	180KΩ	100KΩ	. 1Ω	. 1Ω	▲1. 5KΩ	▲7Meg	3. 5KΩ	0Ω
V 13	12AT7	†12KΩ	2. 5Meg	1KΩ	0Ω	0Ω	†82KΩ	39KΩ	1KΩ	. 1Ω
V 14	6BQ6GA	NC	0Ω	NC	†18KΩ	1Meg	NC	. 1Ω	0Ω	TOP CAP ▲28Ω
V 15	6AX4GT	NC	NC	500KΩ	NC	†60Ω	NC	. 1Ω	0Ω	
V 16	1B3GT	PINS	1-8	HAVE	INF	RESISTANCE				TOP CAP ▲433Ω
V 17	5U4GA	NC	60KΩ	NC	43Ω	NC	46Ω	NC	60KΩ	
V 18	21YP4	0Ω	470KΩ	PIN 6 ▲30Ω	PIN 10 ▲30Ω	PIN 11 ■350KΩ	PIN 12 . 1Ω			

†MEASURED FROM PIN 8 OF V17.
■MEASURED FROM 140 VOLT LINE.
▲MEASURED FROM PIN 2 OF V4.
▲MEASURED FROM PIN 3 OF V15.
NC-NO CONNECTION.
TP-TIE POINT.



TUBE PLACEMENT CHART

SET 293 FOLDER 7

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V14, V15 and V17. Check adjustment B1. Check R85, R87, C70, C69, T2, T4A and other associated components.

DRIVE LINES

Check by substitution V14 and V15. Check R85, R87, C69, C70 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V14 and V15. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V13, V14 and V15. Check C65 for open. Check C64, C66, L33 and other associated components.

XMAS TREE EFFECT

Check by substitution V13, V14 and V15. Check T2 and T4 for internal arcing. Check C63, C62, C67, L33, R81 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V12. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check T3, T4B, C3, R66 and other associated components.	Check vertical integrator network. Check R64, R4, C57 and other associated components.

INSUFFICIENT SWEEP

Substitute V12. Check height and vertical linearity controls for proper operation. Check R64, T3 and other associated components.

COMPRESSED AT BOTTOM

Substitute V12. Check R64, R4, C3 and other associated components.

COMPRESSED AT TOP

Substitute V12. Check R66, R5 C1D, T3 and other associated components.

FOLDS

Substitute V12. Check C59, T3, T4B, R66 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V10 and V11. Check C53, C54, R59, R61, R58 and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISAFACTORY

Check by substitution V11 and V13. Check C61, C65, C64, C66, L33 and other associated components.

HORIZONTAL BENDING

Check by substitution V10, V11 and V13. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C40, C43, L31, R39, R38 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A2. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check picture control. Check R38, L27, L30, C40, C43 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check C40, C43, C41, L30, R39 and other associated components.

SMEAR

Substitute V6. Check L27, L28, L30, R39, C40, C43 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8 and V9. Check stages V8 and V9 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio I F stages for component failure or change of value.	Check C48, C50, C51, R47, R49, T6, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A10 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or no Sound".

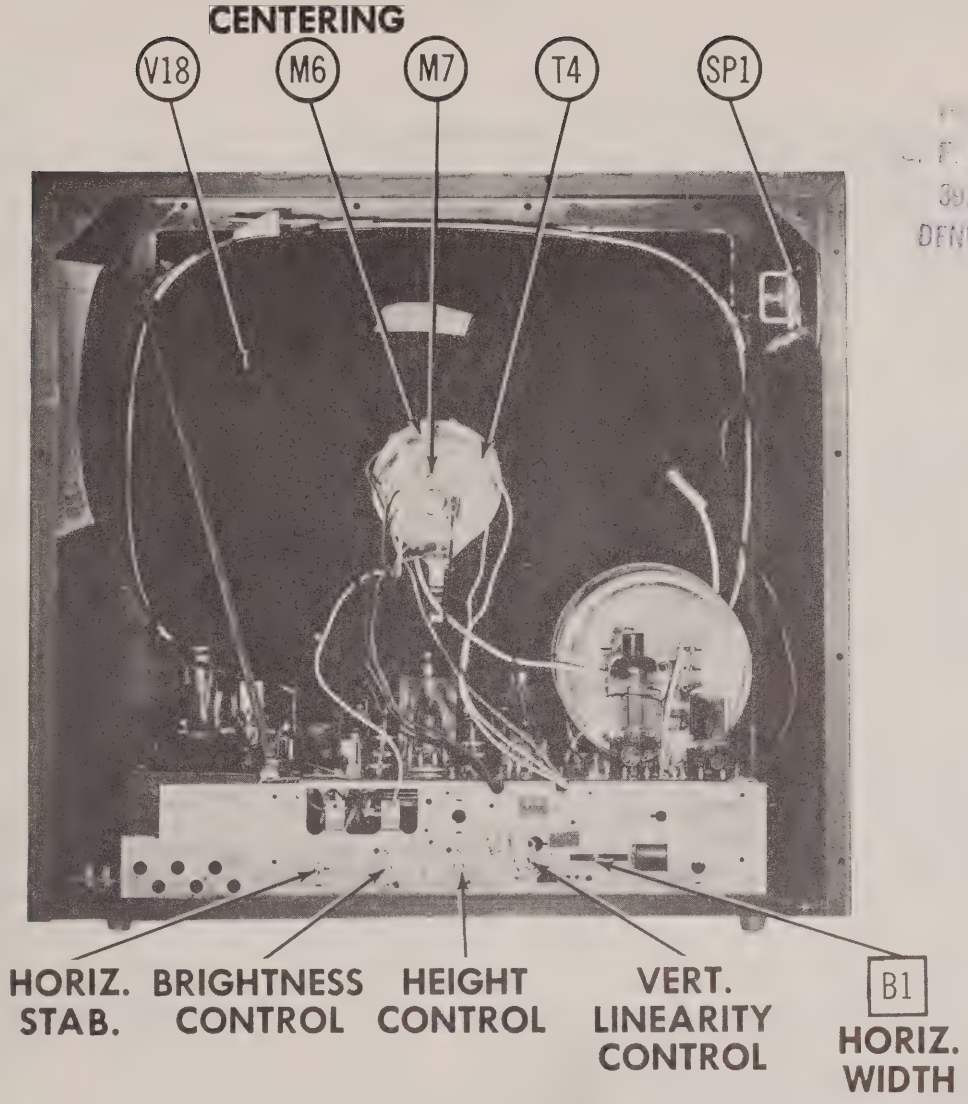
POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V17. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V17. Check B+ filter and decoupling network.



F. L. [illegible]MSHIP
39[illegible] BLADE ST.
DENVER, COLORADO

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Replace V14 in its socket. The horizontal stabilizer coil (L33) has been properly adjusted at the factory and should not require adjustment under normal conditions. If adjustment should become necessary adjust as follows:

① Tune in a TV station, preferably a test pattern.

② Adjust the horizontal stabilizer coil (L33) until picture synchronizes horizontally.

③ Connect the DC probe of a VTVM to point ⟨F⟩. Connect common lead to chassis. Retouch L33 for a reading of a positive 6 volts at point ⟨F⟩.

Adjust the horizontal width slug (B1) for a picture slightly wider than necessary to fill the picture mask horizontally.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp.	6BQ7A	6BQ7A	9AJ	
V2	Mixer-Osc.	6J6	6J6	9AK	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd Video IF Amp.	6AU6	6AU6	7BK	
V8	Video Output	12BY7	12BY7	9BF	
V7	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Det. - AF Amp.	6T8	6T8	9K	
V9	Audio Output	6AQ5	6AQ5	7BZ	
V10	Sync Sep.	6CB6	6CB6	7CM	
V11	Sync Amp. - Horiz. AFC	12AU7	12AU7	9A	
V12	Vert. Mult. - Vert. Output	12BH7	12BH7	9A	
V13	Horiz. Mult.	12AT7	12AT7	9A	
V14	Horiz. Output	6BQ6GA	6BQ6GA	6AM	
V15	Damper	6AX8CT	6AX8CT	6CG	
V16	HV Rect.	1B3GT	1B3GT	3C	
V17	LV Rect.	5U4GA	5U4GA	5T	5U4G used as alternate.

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: General Electric PART No.	CBS PART No	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V18	21YP4	21YP4	21YP4	21YP4	21YP4	12L	① Aluminized
	21YP4A ①	21YP4A ①	21YP4A ①	21YP4A ①	21YP4A ②	12L	② Silver Screen
	17YP4	17LP4, 17YP4	17YP4	17LP4	17YP4, 17LP4	12L	
				17AT4P4		12L	
					17LP4A ②	12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	General Electric PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	60	350	RCE-304			FP344.2	ATM-606080-2	T-115	
B	80	350				TC78	350	MT-1520	
C	40	300					TD-20-150		Note 4.
D	20	150							
C2	5	50	RCE-174			TC30	TD-5-50	MMT-0505	
C3	30	450				TC75	TD-30-450	FM-4530	
C4	5		RCW-3146	TCS-5	NPOA-050	ZT-555			
C5	10		RCW-3144	TCS-10	NPOA-100	ZT-561			
C6	47		RCW-3145	DD-470	SL-470	UC-5447			
C7	800		RCW-3037	DD-801	SL-801	DC-521			
C8	800		RCW-3037	DD-801	SL-801	DC-521			
C9	5-5		RCY-080	829-3	3115-01-0R5	CT565A			
C10	800		RCW-3037	DD-801	SL-801	DC-521			
C11	1000		RCW-3117						
C13	150		RCW-3142	DD-151	SL-151	UC-5315			
C14	3.3		RCW-3147	TCZ-3R3	NPOA-3R3				
C15	47		RCW-3145	DD-470	SL-470	UC-5447			
C16	5-3		RCY-080	829-3	3115-01-0R5	CT565A			
C17	.82		RCW-3118						
C17	5		RCW-3150						
C19	800		RCW-3037	DD-801	SL-801	DC-521			
C20	1000		RCW-3117						
C21	1000		RCW-3117						
C22	800		RCW-3037	DD-801	SL-801	DC-521			
C23	1000		RCW-3117						
C24	1000		RCW-3117						
C25	1000		RCW-3117						
C26	13	500	RCW-3113	TCZ-13				KR-1412	
C27	680		RCW-3051	DS-681		UC-5368		K-1368	
C28	800		RCW-3037	DD-801		DC-521		K-1360	
C29	10	500	UCG-080	TCZ-10		MCB215		KR-1410	
C30	680		RCW-3052	DS-681	GPSK-681	UC-5368		K-1368	
C31	800		RCW-3037	DD-801	SL-801	DC-521		K-1360	
C32	800		RCW-3037	DD-801	SL-801	DC-521		K-1360	
C33	5000		RCW-3014	DD-502	SL-502	DC-525		C-1350	
C34	5000		RCW-3014	DD-502	SL-005	DC-525		C-1350	
C35	800		RCW-3037	DD-801	SL-801	DC-521		K-1360	
C36	5		RCW-3113	TCS-5	NPOA-050	ZT-555		KR-1550	
C37	5		RCW-3113	TCZ-5	NPOA-050	ZT-555		KR-1550	
C38	.2	200				PT401	IMP2-P3	330201	
C39	.1	200		DP-104		PT401	IMP2-P1	330201	Note 1.
C40	.05	200		DP-503		PT415	IMP2-S5	330215	
C41	33		RCW-3169	TCZ-33	NPOL-330	ZT-5433		KR-1433	
C43	30		RCW-3173	TCZ-30	NPOK-300	ZT-543		KR-1530	
C45	.05	600		DP-503		PT415	IMP6-S5	330215	
C46	800		RCW-3037	DD-801	SL-801	DC-521		K-1360	
C45A	4000		RCN-047	DS-402	822-004	DCD-634		C-1240	
B	4000			DS-402				C-1240	
C46	800		RCW-3037	DD-801	SL-801	DC-521		K-1360	Note 1.
C47	5000		RCW-3014	DD-502	SL-005	DC-525		C-1350	
C48A	1000			DD-102	SD-001	DC-521		K-1210	
B	4000		†REK-005	DS-402	SL-004	DC-524		C-1240	
C	10000			DD-103	SL-01	DC-531		K-1380	Note 1.
C49	800			DD-801	SL-801	DC-521	IMP6-S1	330601	
C50	.01	600		D6-103	GPS-333-103	PT615		2105-005	
C51	.0047	1000		DS-472	1RSKV-472	PTI6347	CT10-D47	330615	
C52	.05	600		DF-503		PT615	IMP6-S5	330615	
C53	.025	600		D6-503	GPS-333-503	PT615	IMP6-D5	330615	
C54	470	500	RCU-115	D6-471	GPSK-471	MC345	IMP6-Z5	K-1347	
C55	22	500		D6-220	GPSK-220	UC-5423		K-1423	

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	General Electric PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C56A	4700			DD-472	SL-0047	UC-5247	IMP6-D47	C-1247	
B	10000			DD-103	SL-01	DC-511	IMP6-S1	330611	
C	3300		▲REK-004	D6-332	SL-0022	UC-5223	IMP6-D22	C-1223	
D	1000			DD-102	SD-001	DC-521	IMP6-D1	K-1310	
E	470			DD-471	SL-471	UC-5347	IMP6-T5	K-1347	
C57	.1	200		DP-104		PT401	IMP2-P1	330201	
C58	470	500		D6-471	GPSK-471	MC345		K-1347	
C59	.025	600		DF-503	SL7-03	PT6123	IMP6-S23	3306123	
C60	.01	1000		DD-103		PT1611	CT10-S1	3301-01	
C61	180	500	RCU-155	D6-181	SL-181	MCB337		KR-1318	
C62	750	500	RCU-340	TCN-750	SL-751			KR-1375	
C63	.0012	1000							
C64	.0012	600			SL-122			CR-1212	
C65	.0022	500				MCB457		CR-1220	
C66	.1	200		DP-104		PT401	IMP2-P1	330201	
C67	.0047	600				MCB465		CR-1247	
C68	510	500	RCU-329	TCN-510	N150-334-5U	MC345		KR-1351	
C69	.0047	600		D6-472	GPS-333-472	PT6347	IMP6-D47	3306247	
C70	680	500		D6-681	N150-335-5U			KR-1368	
C71	.05	600		DF-503		PT615	IMP6-S5	330615	
C72	800		RCW-3037	DD-801	SL-801	DC-521		K-1360	
C73	.1	600		DP-104		PT401	IMP6-P1	330601	Note 2.
C74	120	5000	RCU-304	DD60-121					
C75	.05	600		DF-503		PT615	IMP6-S5	330615	
C76	800		RCW-3037	DD-801	SL-801	DC-521		K-1360	
C77	800		RCW-3037	DD-801	SL-801	DC-521		K-1360	Note 1.
C78	.1	600		DP-104		PT401	IMP6-P1	330601	Note 2.
C79	10000			DD-103	SL-01	DC-511			

Note 1. Not used in some versions.
Note 2. Early production versions use 1.0MFD in this application (see note 4).
Note 3. Not used on late production versions (see note 4).
Note 4. On early production versions, mfgr. recommends if C1C is replaced, C1B be removed, and C1A changed to .1MFD.
† Items C48A, C48B, C48C, R44 are combined in one unit.
▲ Items C56A, C56B, C56C, C56D, C56E, R62A, R62B, R62C are combined in one unit.

CONTROLS

ITEM No	RATING: RESIST ance	WATTS	General Electric PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	600Ω	½	RRC-302	QJ-763+	RTV-519	F3-2	UE30S	Picture (Panel)
B	500KΩ					R2-42		Volume attach to R1A (Rear).
C	Switch					KB-1		Attach to R1B.
R1A	250KΩ	½	RRC-304	QH-130	A47-250K-S	A8-46	U-46	Vertical hold.
B	Shaft		Not Req.	Not Req.	KSH-3	AK-9	Not Req.	Attach to R2A.
R2A	300KΩ	½	N-RRC-304					Vertical hold (See Note #).
B	100KΩ		RRC-303	QH-128	A47-100K-S	A8-40	SU-41	Brightness
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A.
R4A	1Meg	½	RRC-301	QH-140	A47-1Meg-S	A8-54	SU-59	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A.
R5	3000Ω	1	RRC-305		39-3000			Vertical Linearity (Wire Wound).

*CONCENTRIC† EQUIVALENT: K-4 KIT, BASE ELEMENTS & SHAFTS: B17-105, P1-220 (Panel) B13-139, R3-312 (Rear) 76-1 Switch

Note 1. This control used in some versions of the "K" line chassis.

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R6	47KΩ	½	URD-089	BTS-47K	Note 4.
R7	22KΩ	½	URD-081	BTS-22K	
R8	100Ω	½	URD-025	BTS-100	
R9	820KΩ	½	URD-119	BTS-820K	
R10	470KΩ	½		BTS-470K	
R11	330KΩ	½	URD-113	BTS-330K	
R12	47Ω	½	URD-041	BTS-470	
R13	3300Ω	½	URD-039	BTS-3900	
R14	150KΩ	½	URD-101	BTS-150K	
R15	15KΩ	½	URD-077	BTS-15K	
R16	100Ω	½	URD-065	BTS-4700	
R17	1200Ω	½	URD-081	BTS-1200	
R18	1Meg	½		BTS-1Meg	Note 8.
R19	1500Ω	½	URD-053	BTS-1500	
R20	6800Ω	1	URE-069	BTA-6800	
R21	3300Ω	1		BTA-3300	
R22	1Meg	½		BTS-1Meg	Note 1.
R23	18Ω	½	URD-007	BTS-18	
R24	3900Ω	½		BTS-3900	Note 2.
R25	3900Ω	½		BTS-3900	Note 1.
R26	56Ω	½	URD-019	BTS-56	
R27	91KΩ 5%	½	URD-095	BTS-91KΩ 5%	Note 7.
R28	91KΩ 5%	½		BTS-SIE 5%	Note 3.
R29	56Ω	½	URD-019	BTS-56	
R30	1000Ω	½	URD-031	BTS-1000	
R31	180Ω	½	URD-031	BTS-180	
R32	33KΩ	½	URD-085	BTS-33K	
R33	1000Ω	½		BTS-1000	
R34	2.2Meg	½	URD-128	BTS-2.2Meg	
R35	2.2Meg	½		BTS-2.2Meg	
R36	4700Ω	½	URD-085	BTS-4700	
R37	1Meg	½	URD-121	BTS-1Meg	
R38	15Ω	½		BTS-15	
R39	4000Ω	½	RRW-124	PWT-4000	
R40	10KΩ	½		BTS-10K	
R41	270KΩ	½	URD-107	BTS-270K	
R42	180Ω	½	URD-031	BTS-180	
R43	330Ω	½	URD-037	BTS-330	
R44	33KΩ	½	†REK-005	BTS-33K	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R45	2.2Meg	½		BTS-2.2Meg	Note 4.
R46	22KΩ	½	URD-081	BTS-22K	
R47	470KΩ	½	URD-113	BTS-470K	
R48	1Meg	½		BTS-1Meg	
R49	50KΩ 5%	½	URD-1042	BTS-50 5%	
R50	1Meg	½		BTS-1Meg	Note 1.
R51	33KΩ	½		BTS-33K	
R52	220KΩ	½	URD-105	BTS-220K	
R53	470KΩ	½	URD-113	BTS-470K	
R54	4.7Meg	½		BTS-4.7Meg	Note 5.
R55	120KΩ	½	URD-099	BTS-120K	
R56	1.2Meg	½		BTS-1.2Meg	
R57	10KΩ	½		BTS-10K	
R58	10KΩ	2		BTS-10K	
R59	220KΩ	½		BTS-220K	
R60	10KΩ	½	URD-073	BTA-10K	
R61	18KΩ	½	URD-079	BTS-18K	
R62A	47KΩ	1		BTS-47K	
B	33KΩ	½	▲REK-004	BTS-33K	
C	82KΩ	½		BTS-82K	
R63	220KΩ	½	URD-105	BTS-220K	
R64	5.6Meg	½	URD-133	BTS-5.6Meg	
R65	270Ω	½	URD-035	BTS-270	
R66	2700Ω	3		BTS-2700	Note 6.
R67	150KΩ	½	URD-101	BTS-150K	
R68	470KΩ	½		BTS-470K	
R69	2200Ω	½		BTS-2200	
R70	2200Ω	½		BTS-2200	
R71	910KΩ 5%	½	URD-1120	BTS-910K 5%	
R72	3600Ω 5%	½	URD-1062	BTS-3600 5%	Note 9
R73	910KΩ 5%	½	URD-1120	BTS-910K 5%	
R74	10Meg	½	URD-145	BTS-10Meg	
R75	220KΩ	½	URD-105	BTS-220K	
R76	470KΩ	1		BTA-470K	
R77	470KΩ	1		BTA-470K	
R78	470KΩ	½	URD-113	BTS-470K	
R79	39KΩ	½		BTS-39K	
R80	1000Ω	½	URD-049	BTS-1000	
R81	12KΩ	½		BTS-12K	

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R82	30KΩ 5%	½	URD-1087	BTS-30K 5%	
R83	4.7Meg	½	URD-127	BTS-4.7Meg	
R84	82KΩ	½	URD-095	BTS-82K	
R85	12KΩ	½	URD-075	BTS-12K	
R86	1Meg	½	URD-131	BTS-1Meg	

ITEM No.	RATING: OHMS	WATTS	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R87	18KΩ	2	URF-079	BTB-186	
R88	3.3Ω	½	RRW-105		
R89	22000	½		BTS-2200	
R90	470KΩ	½		BTS-470K	
R91	470Ω	½	URD-041	BTS-470	Note 1.

Note 1. Not used in some versions.
Note 2. Some versions use a 2200Ω resistor in this application.
Note 3. Some versions use a 43KΩ resistor in this application.
Note 4. Some versions use a 1.5Meg resistor in this application.
Note 5. Some versions use a 10Meg resistor in this application.
Note 6. Some versions use a 2200Ω 1 watt resistor in this application.
Note 7. Some versions use a 68KΩ resistor in this application.
Note 8. Some versions use a 470ΩΩ resistor in this application.
Note 9. Some versions use a 4300Ω resistor in this application.
† Items R44, C48A, C48B, and C48C are combined in one unit.
▲ Items R62A, R62B, R62C, C56A, C56B, C56C, C56D and C56E are combined in one unit.

TRANSFORMER (POWER)

ITEM No	RATING: PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA: General Electric PART No.	Hallodrson PART No	Merit PART No	RCA TYPE No	Stancor PART No	Thordarson PART No	Triad PART No
T1	117VAC	570VCT	5VAC	RTP-325	P9733①	P-8836①		P-8164①		
	① 1.44A	.210ADC	② 3A			②				
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC									
	① 9A									

① Remove lower shell, and replace with shell of original unit.
② Tape 6.3V ③ 1.2A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: General Electric PART No.	Hallodrson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Horiz. Output Trans.	RTO-161							
T3	Vert. Output Trans.	RTO-162	Z1803①	A-3036①		V3076②	A-8144②	26S73	A-108X①
T4A	Yoke-Horiz. (12MH)	RLD-067①							
B	Vert. (41MH)	RLD-053①④							
T5	Width Coil (1.5-11MH)	RLD-056	RF800③	MWC-6③	212RI③	20UR16③	WC-8③	WC-22	WC-13③

① Connect as auto trans.
② Drill new mounting hole(s).
③ Includes resistors R69, R70.
④ Alternate deflection yoke.
⑤ Drill new mounting hole, or use original slider & core.
⑥ Connect to coded red & blue terms.
⑦ Connect to terms #1 & #2.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI.	SEC	REPLACEMENT DATA: General Electric PART No.	Hallodrson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T6	15KΩ	3.6Ω	RTO-153	Z1000①	A-3900①	A-3650①	24S60①	S-51X①	① Drill one new mounting hole.
			N-RTO-153②						② Alternate audio output trans.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: General Electric PART No	QUAM PART No.	NOTES
SP1	4"	PM	3.6Ω	N-S403D-7①	4A07	① Used in models 17T14, 17T16, 21T17, 21T18, and 21T28.
	8"	PM	3.6Ω	N-S835D-7①	8A31	② Used in model 21C102.
	10"	PM	3.6Ω	ROP-015②	10A31	③ Used in model 21C238.

COILS (RF-IF)

ITEM No.	USE	DC RES: PRI.	DC RES: SEC	REPLACEMENT DATA: General Electric PART No.	MEISSNER PART No	MERIT PART No	MILLER PART No	NOTES
L1	VHF IF Output	.1Ω	.1Ω	RTL-184				Part of complete assembly Part No. RSX-045.
L2	VHF Antenna Trans.	.20CT	.1Ω*	RLA-042				*Tapped
L3	IF Trap	.3Ω		RLJ-264				
L4	VHF Antenna Coil	ΩΩ						Channel 6-Part of complete assembly.
L5	VHF Antenna Coil	ΩΩ						Channel 13-Part of complete assembly.
L6	VHF Antenna Coils	ΩΩ						
L7	VHF Antenna Coils	ΩΩ						
L8	Neut. Coil	ΩΩ		RLI-389				
L9	VHF RF Coil	ΩΩ		RSX-044				Channel 13-Part of complete assembly
L10	VHF RF Coil	ΩΩ		RSX-044				Channel 6-Part of complete assembly.
L11	UHF IF Coil	ΩΩ		RSX-044				Part of complete assembly.
L12	VHF RF Coils	ΩΩ		RSX-044				
L13	Mi-Band Coupling Strap	ΩΩ						
L14	VHF Mixer Grid Coil	ΩΩ		RSX-043				Channel 13-Part of complete assembly.
L15	VHF Mixer Grid Coil	ΩΩ		RSX-043				Channel 6-Part of complete assembly.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L16	UHF IF Coil	0Ω		RSX-043				Part of complete assembly.
L17	VHF Mixer Grid Coils	0Ω		RSX-043				Complete assembly.
L18	VHF Osc.Coils	0Ω		RSX-043				
L19	RF Coil	0Ω						
L20	RF Choke	0Ω		RLI-288				
L21	Conv. Plate	0Ω		RLI-285				
L22	47.25MC Trap	0Ω		RLI-246	17-4502*			
L23	1st Video IF	.1Ω		RLI-192	17-4500■	TV-130▲	6219▲	
L24	2nd Video IF	.1Ω		RLI-192	17-4500■	TV-130▲	6219▲	
L25	3rd Video IF	.1Ω	.1Ω	RTL-155	17-4522	TV-130	6219	
L26	4th Video IF	.1Ω	.1Ω	RTL-154	17-4524			
L27	Series Peaking Coil	8.2Ω		RLI-138	19-1005		4612	10Microhenries, IRC Part No. CL-1.
L28	Series Peaking Coil	2.1Ω		RLF-024	19-3036	TV-180	6176	31 Microhenries
L29A B	4.5MC Trap Sound IF	3Ω 2.4Ω		RLI-312				
L30	Series Peaking Coil	7.5Ω		RLI-311	19-3180▲	TV-184▲	6180▲	180 Microhenries, Wound on 22KΩ resistor.
L31	Shunt Peaking Coil	8.7Ω		RLI-194	19-3300		6155	330 Microhenries
L32	Ratio Det.	5.3Ω	.6ΩCT	RTD-018				Tertiary Winding=.6Ω
L33	Horiz. Osc.	73Ω		RLI-247	19-1576♦	TV-163♦	6210♦	
L34	RF Choke	8.2Ω		RLI-138	19-1005		4612	10 Microhenries, IRC Part No. CL-1.

* Use trap winding only.
■ Detune trap winding.
▲ Use one winding only.
▲ Parallel with 22KΩ resistor.
♦ Enlarge mounting hole.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA General Electric PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L35	.193ADC	51.5Ω	1HY	RLF-068	C5040	C-2994	C-2327	26C44①	C-23X①

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA General Electric PART No. FUSE	General Electric PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG S/B	1/4 A 125V	N-REF-019		313.250 (3AG S/B 1/4 A)	101002	MDL 1/4	4548

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA General Electric PART No.	REPLACEMENT DATA SYLVANIA PART No.	NOTES
M2	1N87	RED-001	1N60	Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M3	Tuner	RJX-066	VHF-VHF only, or VHF-UHF Chassis. Not used in all versions.
	Tuner	RJX-068	VHF-VHF only, or VHF-UHF Chassis. Used in some versions
M4	Tuner	RUX-008	UHF-VHF-UHF Chassis. Not used in all versions.
	Tuner	RUX-009	UHF-VHF-UHF Chassis. Used in some versions.
M5	Switch	RSW-108	Local-distant
M6	Centering device	REA-008	
M7	Ion Trap	RET-013	
	Cabinet	RAV-257	Model 21T17
	Cabinet	RAV-258	Model 21T18
	Cabinet	RAV-259	Model 17T14
	Cabinet	RAV-260	Model 17T16
	Cabinet	RAV-263	Model 21T28
	Cabinet	RAV-264	Model 21C102
	Cabinet	RAV-265	Model 21C238
	Knob	RDK-413	On-Off-Volume-Models 17T14, 21T17
	Knob	RDK-404	On-Off-Volume-Models 17T16, 21T18, 21T28, 21C102
	Knob	RDK-423	On-Off-Volume-Model 21C238
	Knob	RDK-414	Picture-Models 17T14, 21T17
	Knob	RDK-403	Picture-Models 17T16, 21T18, 21T28, 21C102, 21C238
	Knob	RDK-451	Vertical-Models 17T14, 21T17
	Knob	RDK-332	Vertical-Models 17T16, 21T18, 21T28, 21C102, 21C238
	Knob	RDK-452	Local-Distant-Models 17T14, 21T17
	Knob	RDK-453	Local-Distant-Models 17T16, 21T18, 21T28, 21C102, 21C238
	Knob	RDK-454	VHF Selector-Models 17T14, 21T17
	Knob	RDK-455	VHF Selector-Models 17T16, 21T18, 21T28, 21C102
	Knob	RDK-439	VHF Selector-Model 21C238
	Knob	RDK-456	VHF Tuning-Models 17T14, 21T17
	Knob	RDK-457	VHF Tuning-Models 17T16, 21T18, 21T28, 21C102, 21C238
	Knob	RDK-458	UHF Indicator -Models 17T14, 21T17
	Knob	RDK-459	UHF Indicator-Models 17T16, 21T18, 21T28, 21C102, 21C238
	Knob	RDK-460	UHF Tuning-all Models
	Safety Glass	RDW-084	Models 17T14, 17T16
	Safety Glass	RDW-083	Model 21T17
	Safety Glass	RDW-086	Models 21T18, 21T28, 21C102
	Safety Glass	RDW-087	Model 21C238
	Mask	RDM-057	Model 17T14
	Mask	RDM-058	Model 17T16
	Mask	RDM-055	Model 21T17
	Mask	RDM-056	Model 21T18
	Mask	RDM-059	Models 21T28, 21C102
	Mask	RDM-060	Model 21C238

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. E. SMYTHSHIP
3624 MEADE ST.
DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V13, V14, V15 and V16. Check fuse, M1. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check T2, T4A, T5, C71, C72, C73, C74, R87 and other associated components.	Check L33, C67, C68, C69, R81, R84, R80 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V14, V15 and V17. Check T2, T4A, C69, R87 and other associated components.

BLOOMING

Check by substitution V14, V15, V16, and V17. Check R87, R89, C69 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or no Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

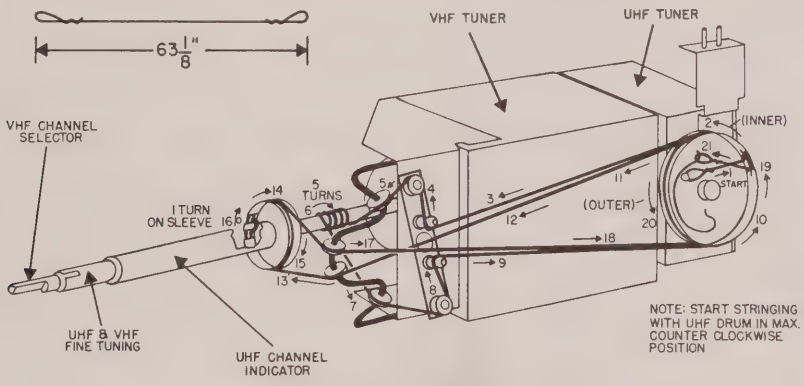
KEYSTONE EFFECT

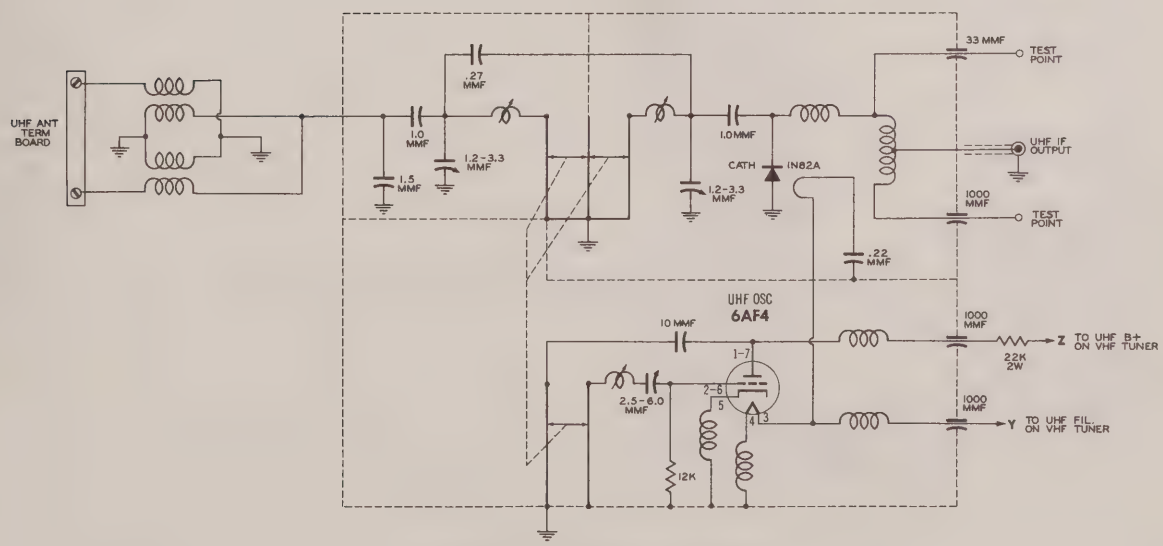
Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.





UHF TUNER RUX-008 USED WITH SOME VERSIONS

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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UHF TUNER SCHEMATIC

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator Circuit may be accomplished by removing the Channel Selector and Fine Tuning knobs.

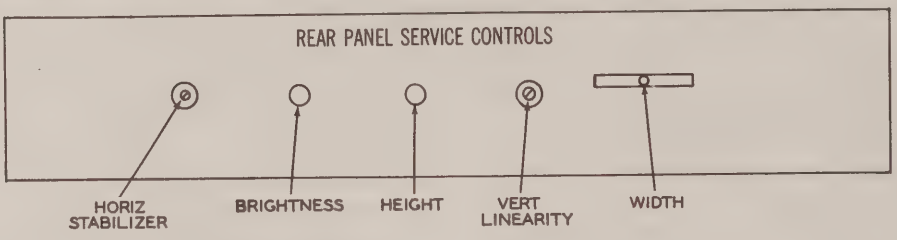
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 wood screws holding metal strip at the top of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions.)

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Adjust the horizontal stabilizing coil (L33) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary(L32) located on top of chassis. (See tube placement chart).

FUSES

One fuse is used for Horiz. Sweep Circuit protection. (For location see Tube Placement Chart.)

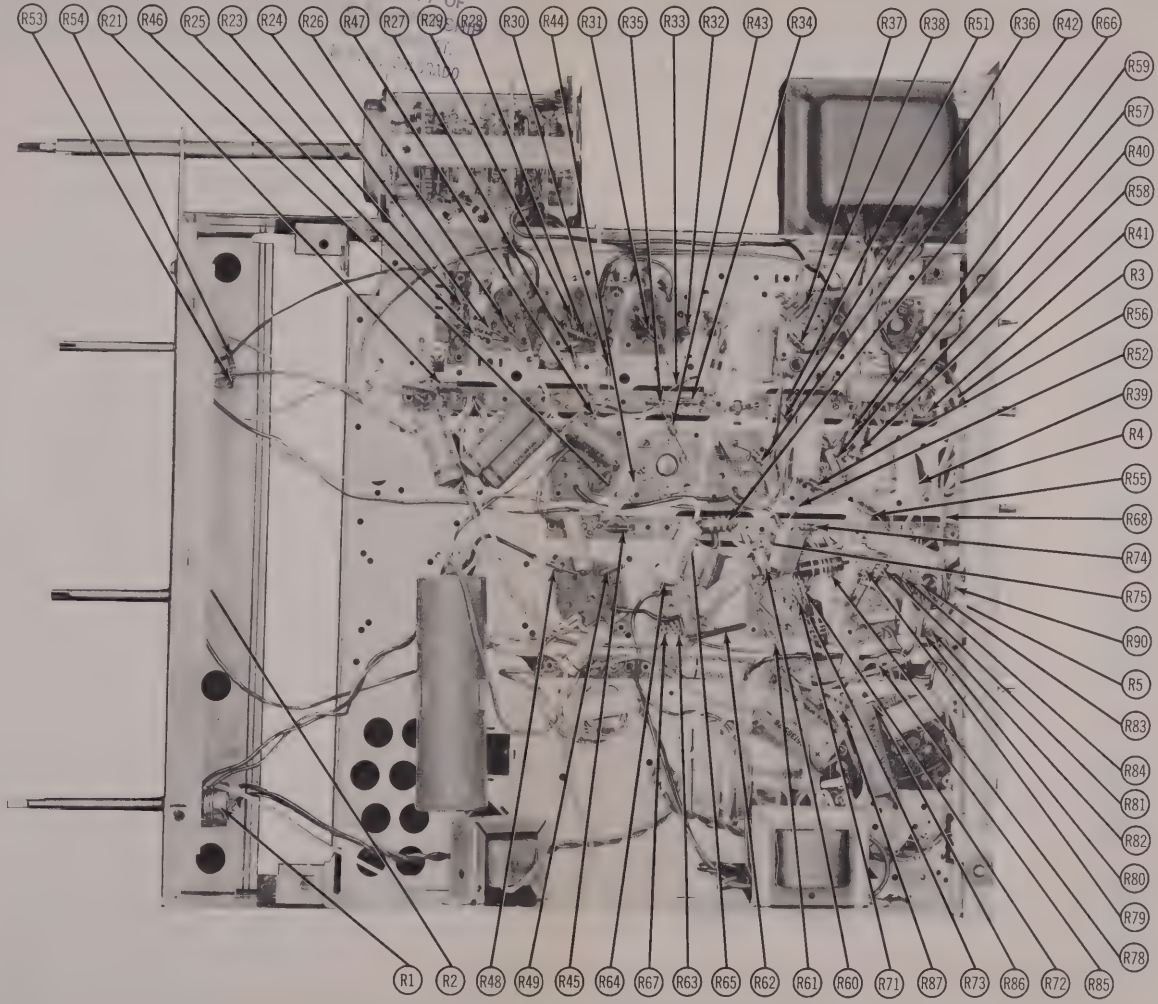
CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 6 push-on type control knobs from front panel of cabinet.
2. Remove 3 metal screws and 2 wood screws. Remove rear cover.
3. Loosen 2 metal screws. Remove antenna bracket.
4. Disconnect speaker leads.
5. Remove 6 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

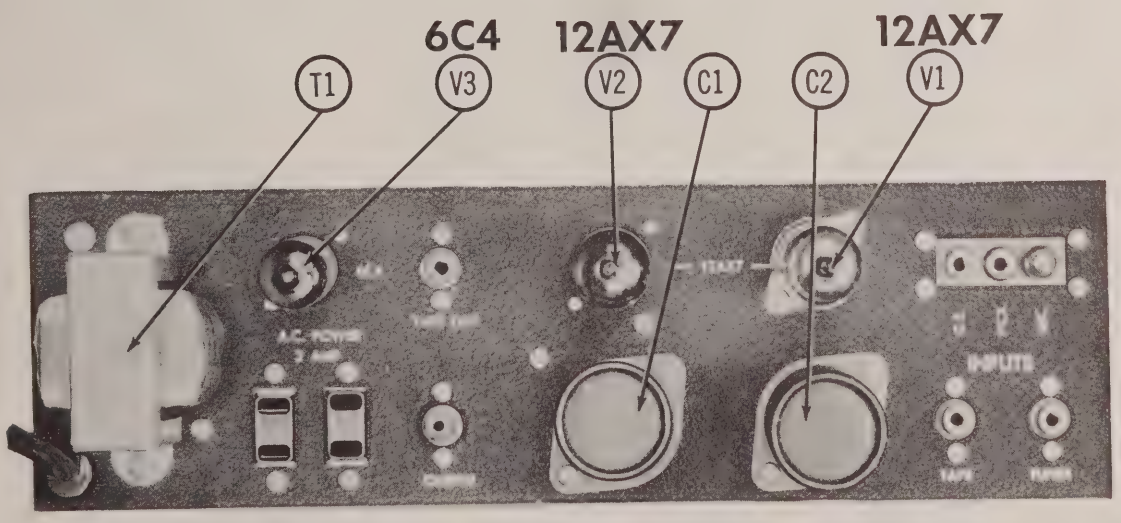
KNIGHT
MODEL 93SX315

PROPERTY OF
[illegible] SCHOOL
3324 TEJON ST.
DENVER, COLORADO

KNIGHT
MODEL 93SX315

TRADE NAME	Knight Model 93SX315
SUPPLIER	Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill.
TYPE SET	AC Operated Five Channel Audio Preamplifier
TUBES (Three)	Types 12AX7 Preamp., 12AX7 Cath. Follower-AF Amp., 6C4 AF Amp.
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.05 Amp. @ 117 Volts AC

KNIGHT
MODEL 93SX315



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PARTS LIST AND DESCRIPTIONS

KNIGHT
Model 93SX315

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		KNIGHT PART No.	STANDARD REPLACEMENT		
V1	Preamp.	12AX7	12AX7	9A	
V2	Cathode Follower AF Amp.	12AX7	12AX7	9A	
V3	AF Amp.	6C4	6C4	6BG	

CAPACITORS

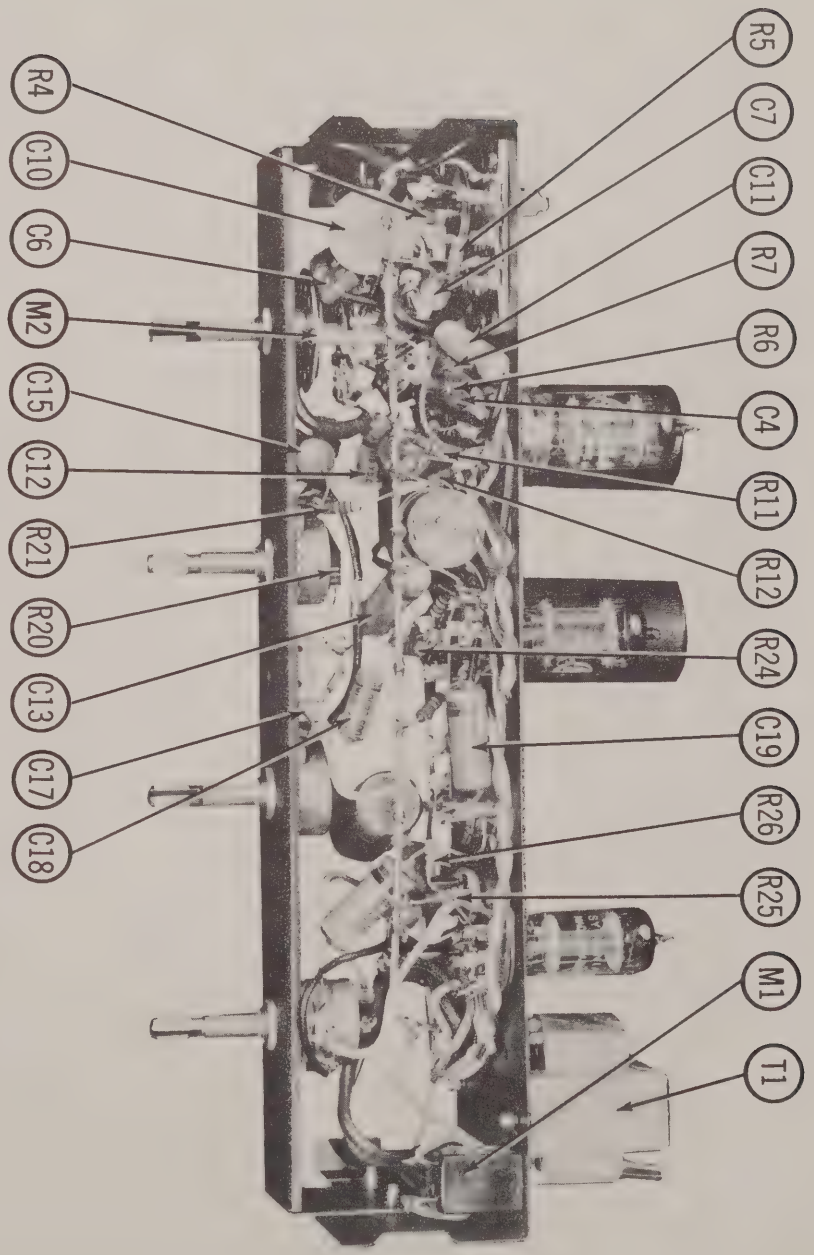
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	KNIGHT PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■30	150				FP306	TM-402020-150	T-035	
B	▲15	150							
C	15	150				FP330.5	TM-T10-300	T-095	
C2A	▲10	150							
B	10	150							
C	■10	150				TCD48	TDL-D40-150	MTD-1540	
C3A	40	25							
B	40	25							
C4	.082	200							
C5	.18	200						K-1439	
C6	39	500		TCZ-39	NPOL-390			3306233	
C7	.0033	600		D6-332	GP2-333-332	PT6233	IMP6-D33	KR-1333	
C8	330			DD-331	811-331	UC-5333		KR-1350	
C9	500			DD-501	811-501	UC-535		CR-1247	
C10	4700							3304122	
C11	.022	200		DD-203	817-02	PT4122	IMP4-S22	3304122	
C12	.022	200		DD-203	817-02	PT4122	IMP4-S22	330415	
C13	.056	200		DF-503		PT415	IMP4-S5	C-1256	
C14	.0056	200		D6-562	GP3-333-562				
C15	.056	200						KR-1333	
C16	330			DD-331	811-331	UC-5333		K-1415	
C17	15	500		TCZ-15	NPOK-150			3306233	
C18	.0033	600		D6-332	GP2-333-332	PT6233	IMP6-D33	330215	
C19	.056	200		DF-503		PT415	IMP2-S5	330215	
C20	.056	200		DF-503		PT415	IMP2-S5	330215	
C21	.056	200		DF-503		PT415	IMP2-S5		
C22	.02	600							

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	KNIGHT PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	RP-504AD-A	Q13-133X	A47F4-500K	ABT-62	UT-429	Volume taped at 40KΩ.
B	Shaft		Not Req.	Not Req.	KSS-3	AK4	Not Req.	Attach to R1A.
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R1A.
R2A	500KΩ	½	RP-405AE-A	Q13-133	A47-500K-Z	B-60	U48	Treble
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R2A.
R3A	500KΩ	½	RP-405AE-A	Q13-133	A47-500K-Z	B-60	U48	Bass
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R3A.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	KNIGHT PART No.	IRC PART No.	
R4	27KΩ	½		BTS-27K	
R5	22KΩ	½		BTS-22K	
R6	220KΩ	½		BTS-220K	
R7	6800Ω	½		BTS-6800	
R8	220KΩ	½		BTS-220K	
R9	100KΩ	½		BTS-100K	
R10	100KΩ	½		BTS-100K	
R11	470KΩ	½		BTS-470K	
R12	1500Ω	½		BTS-1500	
R13	100KΩ	½		BTS-100K	
R14	10KΩ	½		BTS-10K	
R15	470KΩ	1		BTS-470K	
R16	470KΩ	1		BTS-470K	
R17	4700Ω	1		BTS-4700	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	KNIGHT PART No.	IRC PART No.	
R18	22KΩ	½		BTS-22K	
R19	4700Ω	½		BTS-4700	
R20	47KΩ	½		BTS-47K	
R21	4700Ω	½		BTS-4700	
R22	47KΩ	½		BTS-47K	
R23	3000Ω 5%	½		BTS-3000 5%	
R24	68KΩ	½		BTS-68K	
R25	3300Ω	½		BTS-3300	
R26	22KΩ	½		BTS-22K	
R27	2200Ω	½		BTS-2200	
R28	4700Ω	½		BTS-4700	
R29	4700Ω	½		BTS-4700	
R30	4700Ω	½		BTS-4700	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ② .05A	120VCT .0022A	6.3VAC ② .72A		LP-0243	P9101 ②	P-3046 ①	PS8415	26R32 ①	

① Drill one new mounting hole.
② Use half of HV secondary.

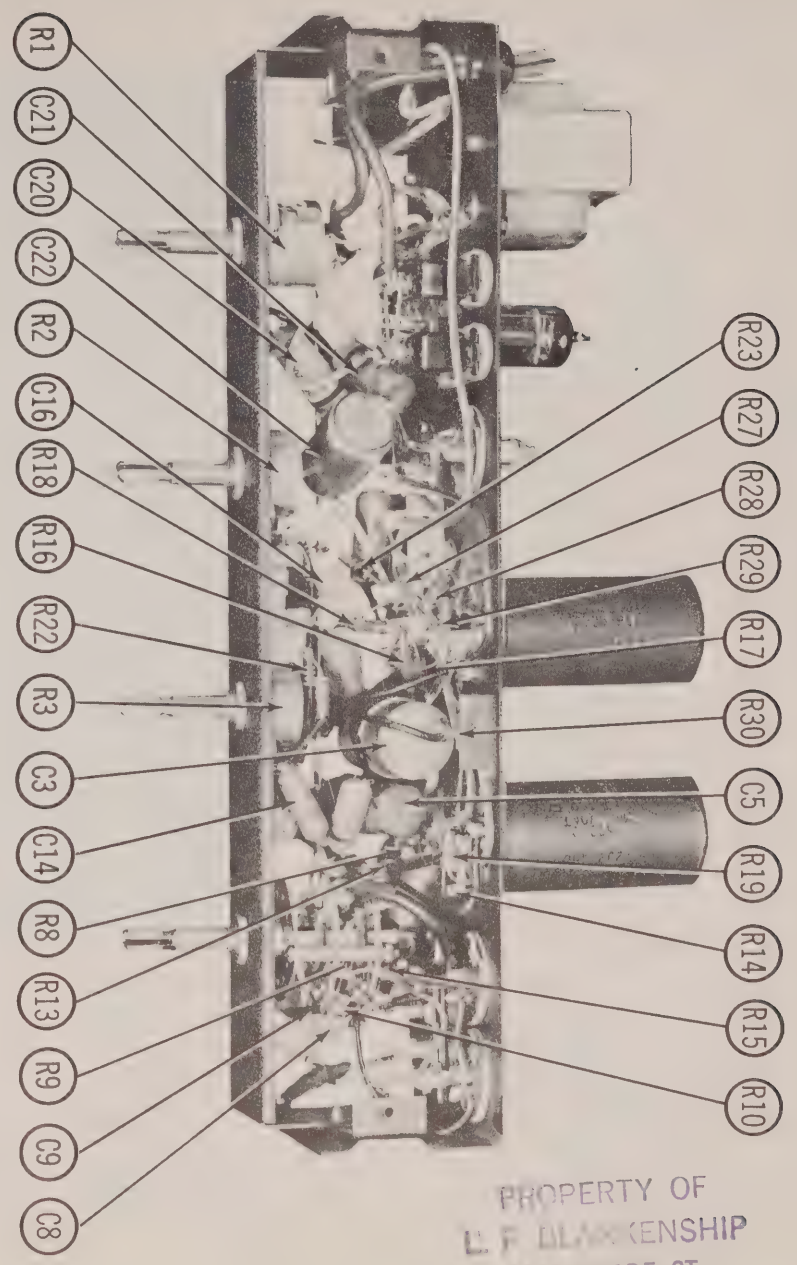
SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	KNIGHT PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.0022A		1263	RS-050	8S20	8Y1	50	

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M2	Switch		Selector & Phono Compensation (Rotary-Wafer Type).

CHASSIS—BOTTOM VIEW



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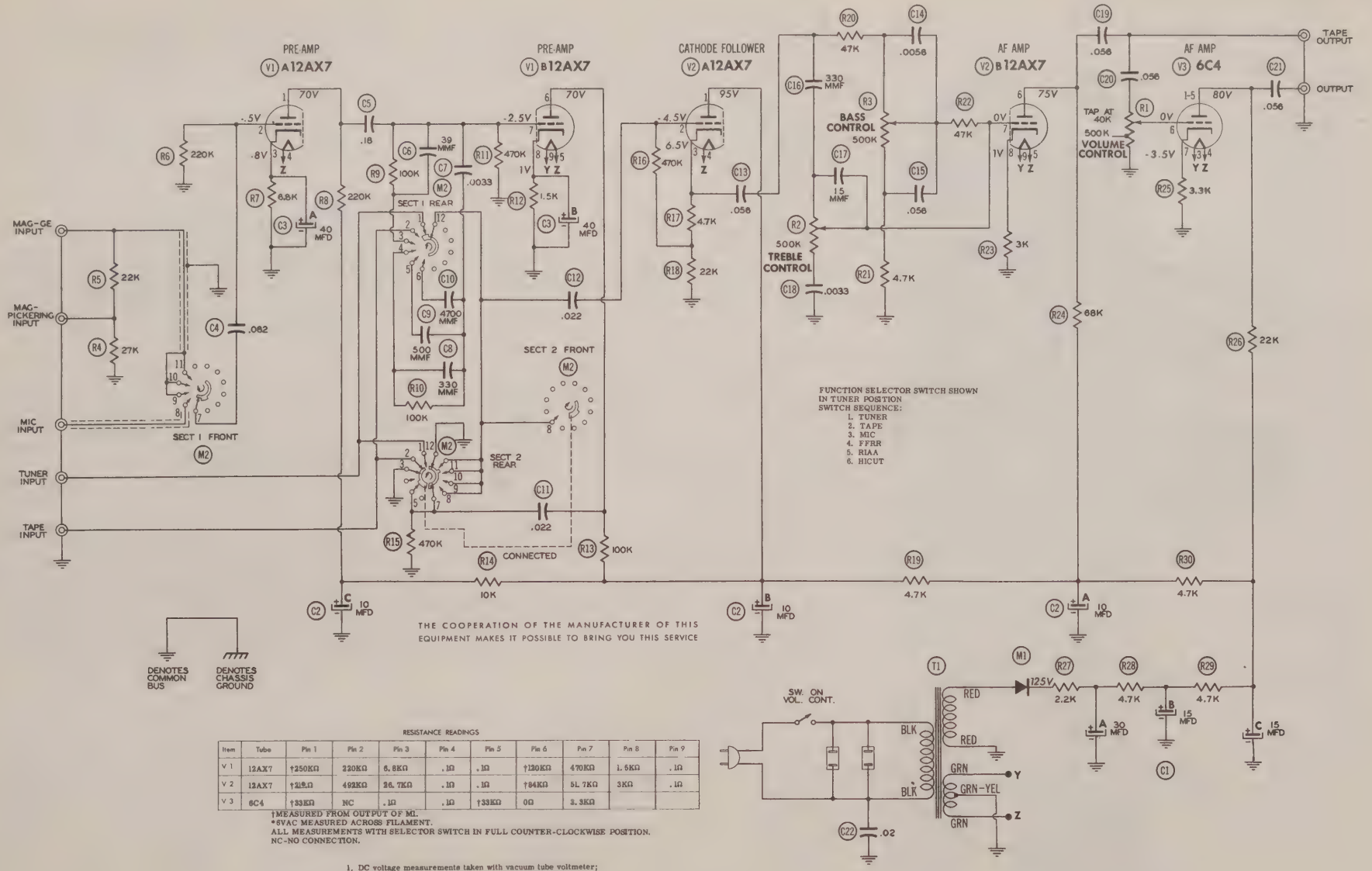

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†250KΩ	220KΩ	6.8KΩ	.1Ω	.1Ω	†120KΩ	470KΩ	1.5KΩ	.1Ω
V 2	12AX7	†2.9Ω	492KΩ	26.7KΩ	.1Ω	.1Ω	†84KΩ	5L 7KΩ	3KΩ	.1Ω
V 3	6C4	†33KΩ	NC	.1Ω	.1Ω	†33KΩ	0Ω	3.3KΩ		

†MEASURED FROM OUTPUT OF M1.
*6VAC MEASURED ACROSS FILAMENT.
ALL MEASUREMENTS WITH SELECTOR SWITCH IN FULL COUNTER-CLOCKWISE POSITION.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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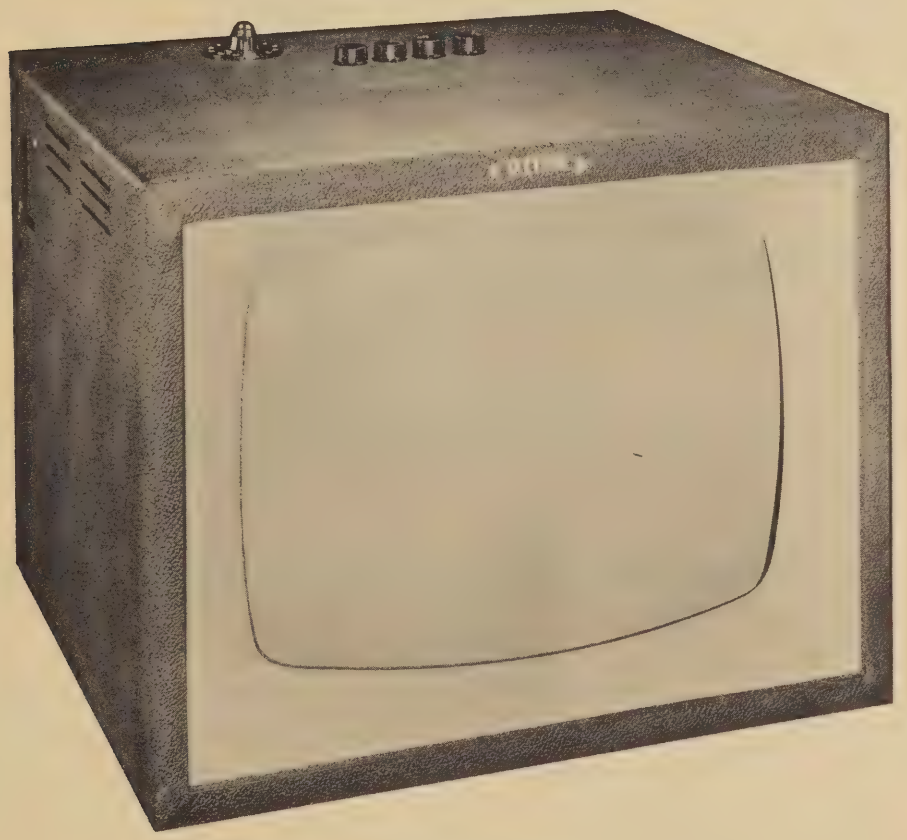

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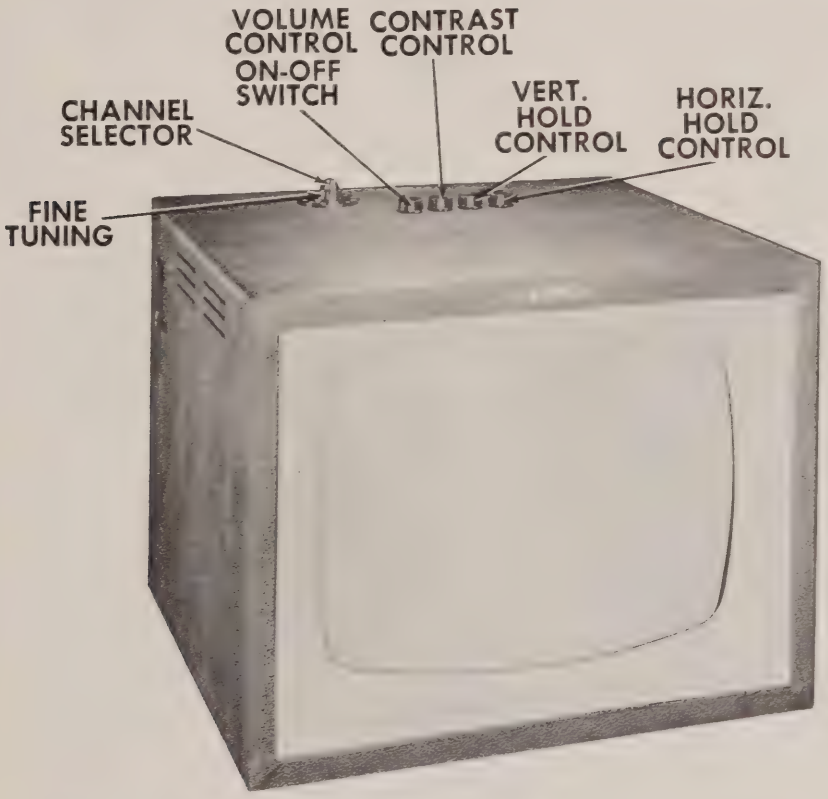

METEOR MODEL 4109A (Ch. 528.34800)

TRADE NAME	Meteor Models 4103A (Ch. 528.34700, 528.34701), 4109A (Ch. 528.34800, 528.34801)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	Television Receiver
TUBES	Sixteen
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING 1.27 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)

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METEOR MODELS 4103A, 4109A (Ch. 528.34700, 528.34701, 528.34800, 528.34801)

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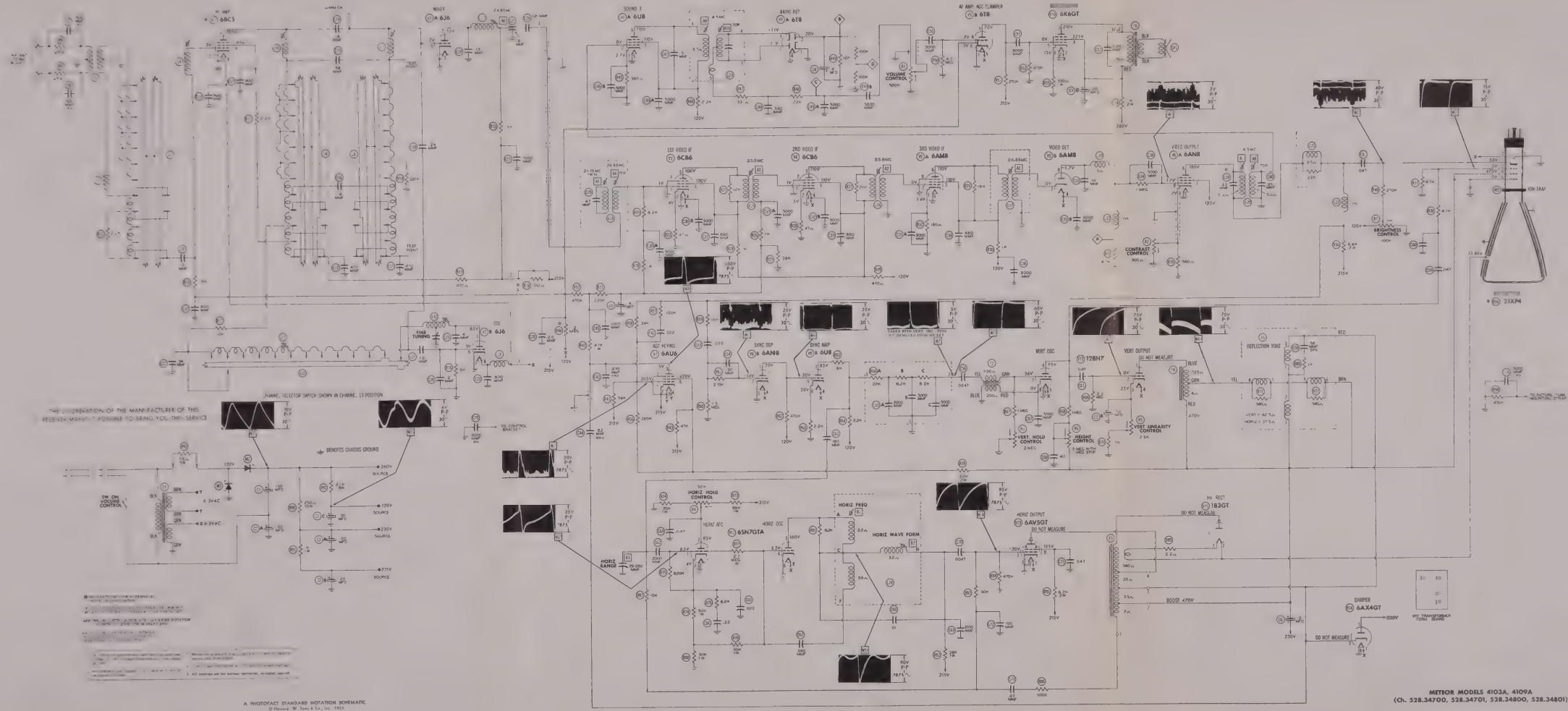
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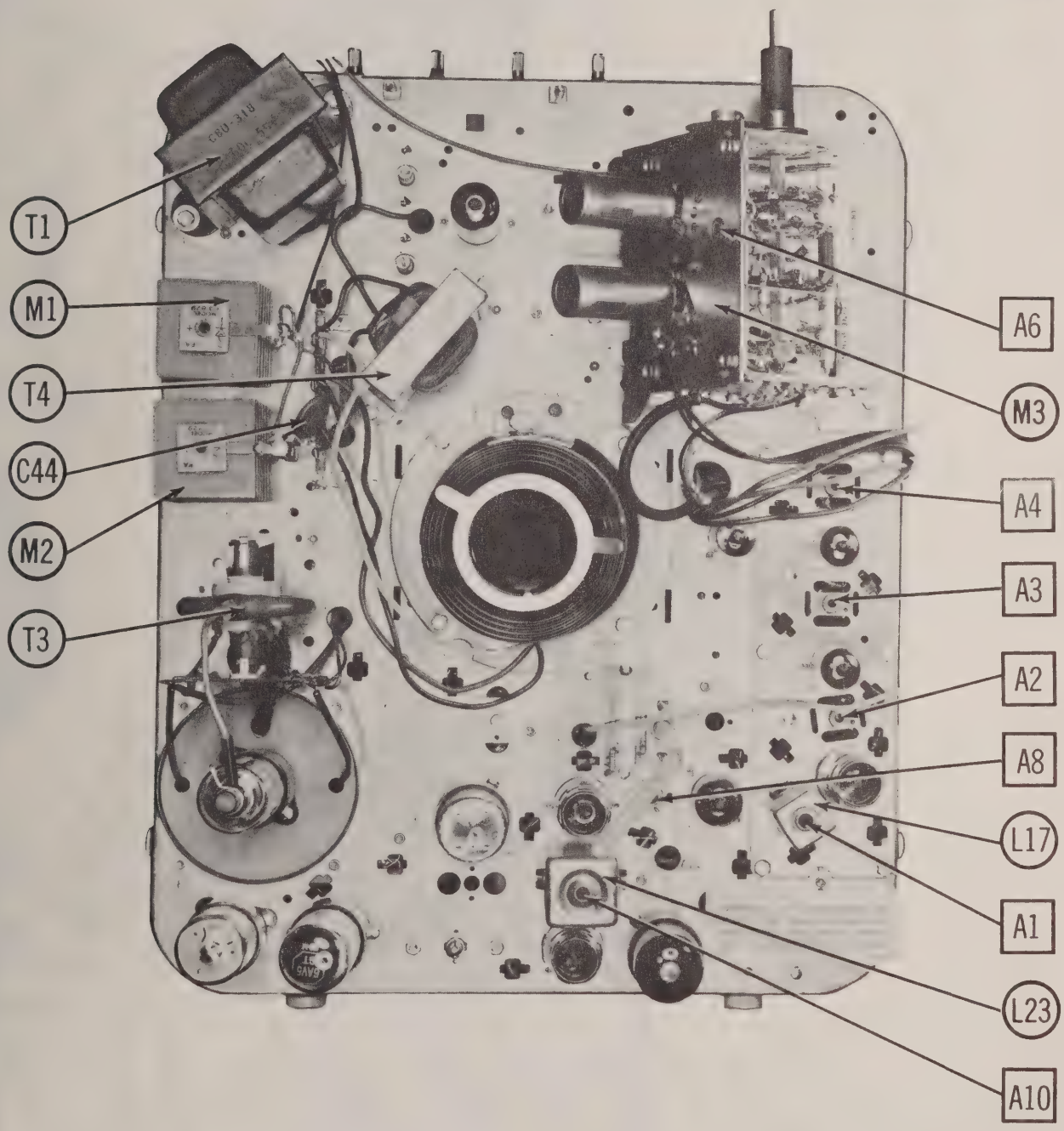
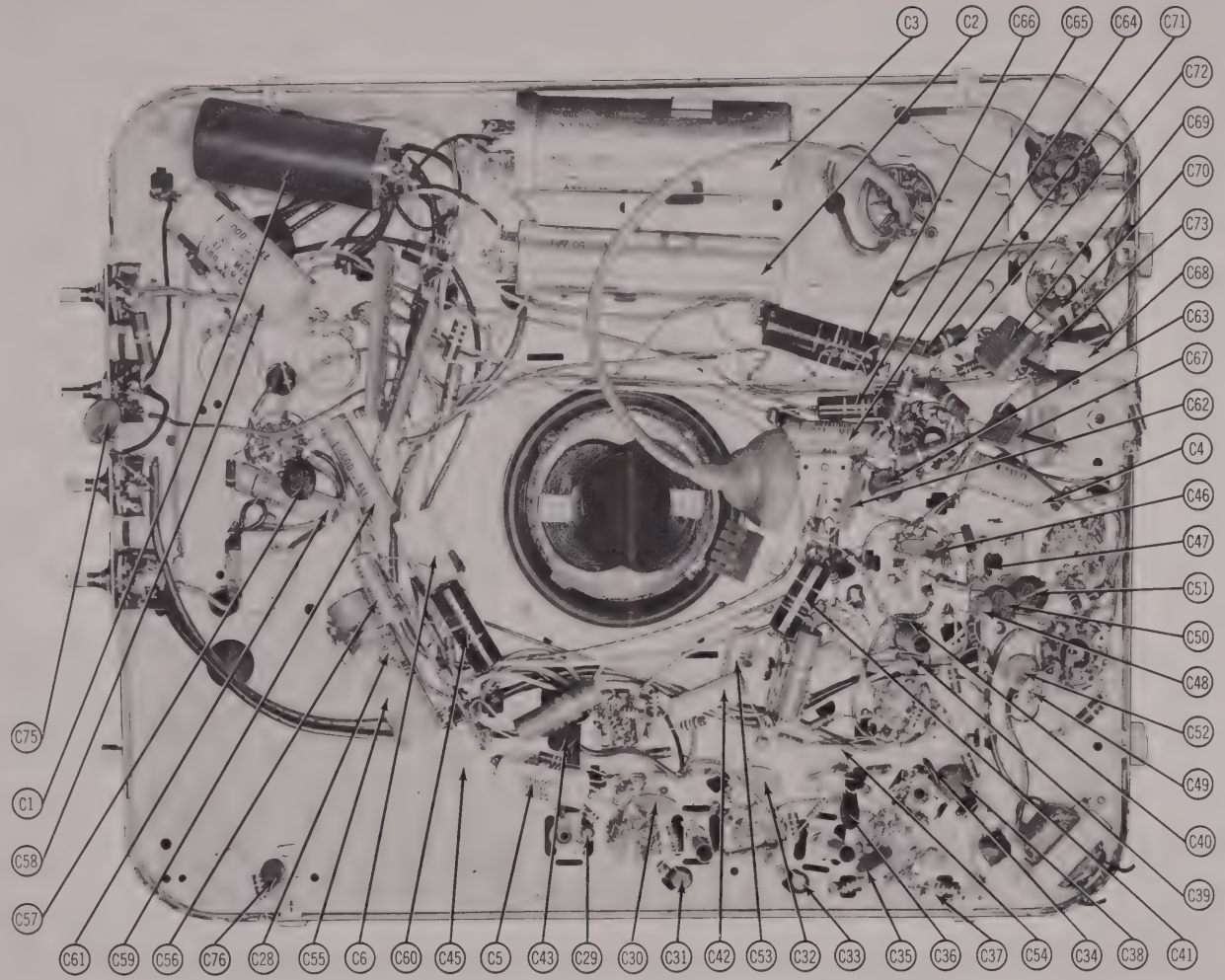


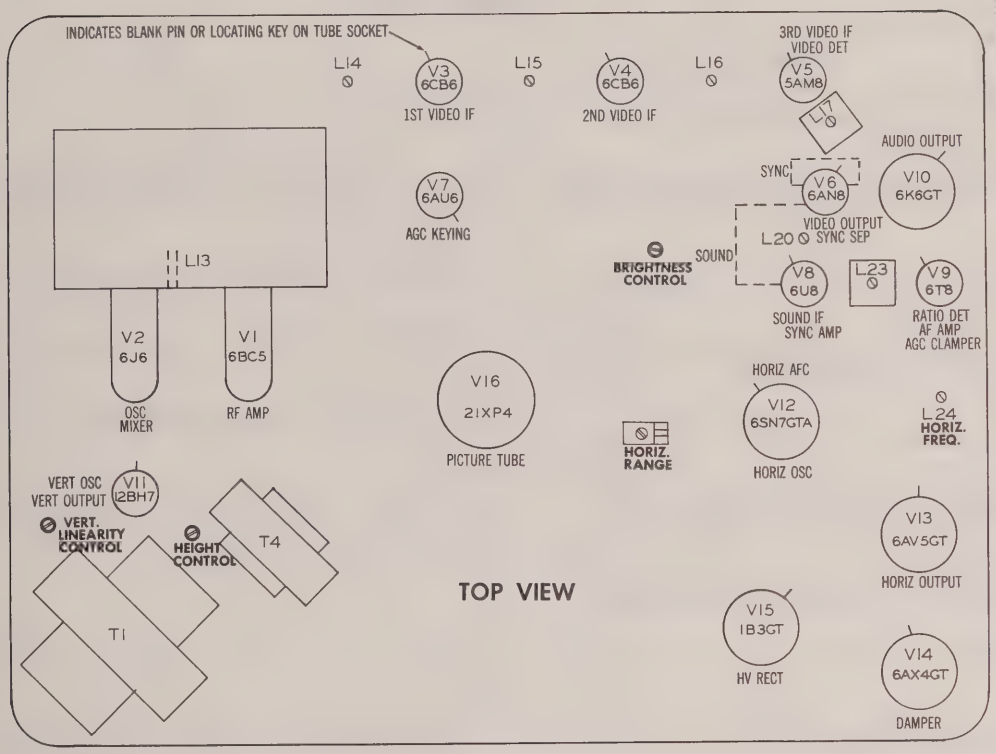
CHASSIS TOP VIEW

DENVER, COLORADO



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V16
Has pic, no sound - V8, V9, V10
Overloaded picture - V7, V9

SYNC FAILURE
No vert. sync - V8, V11
No horiz. sync - V8, V12
No vert. or horiz. sync - V6, V8

SWEEP FAILURE
No raster, has sound - V12, V13, V14, V15, V16
No vertical deflection - V11
Poor vert. linearity or foldover - V11
Poor horiz. linearity or foldover - V12, V13, V14
Narrow picture - V12, V13, V14, V15, M1, M2
Vert. off freq. - V8, V11
Horiz. off freq. - V8, V12

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2044 BLAKE ST
DENVER, COLORADO

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage."

INSUFFICIENT SWEEP

Check by substitution V13 and V14. Check M1 and M2. Check C70, R85, R93, T3, T5A and other associated components.

DRIVE LINES

Check by substitution V13 and V14. Check C68, C69, C70, R85, R93, T3, T5A and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V13 and V14. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines."

PIE CRUST EFFECT

Check by substitution V12, V13 and V14. Check C65, C66 for open. Check L24, R80, R81, R4 and other associated components.

XMAS TREE EFFECT

Check by substitution V12, V13 and V14. Check T3 and T5 for internal arcing. Check L24, C71, C67, C68, R76, R73 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V11. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R70, R5 and other associated components.	Check T2, R67, R68, R6, C57, C58, C61 and other associated components.

INSUFFICIENT SWEEP

Substitute V11. Check height and vertical linearity control for proper operation. Check R68, T4 and other associated components.

COMPRESSED AT BOTTOM

Substitute V11. Check R6, R68, C61, T2 and other associated components.

COMPRESSED AT TOP

Substitute V11. Check R5, R70, C2B, C61, T4 and other associated components.

FOLDS

Substitute V11. Check T2, T4, C58, C61 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V6 and V8. Check C53, C54, R59, R62, R63, R64 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V11. Check vertical integrator network. Check C57, C56, T2, R67, R3 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Substitute V12. Check C62, C63, C64, C65, C66, R73, R74, R4, L24 and other associated components.

HORIZONTAL BENDING

Check by substitution V6, V8 and V12. Check components associated with V12.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C38, C41, L22, R36, R35 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture, Check adjustment A7. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check video detector network. Check C38, C41, L21, L18, R36 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check C38, C41, L18, L21 and other associated components.

SMEAR

Substitute V6. Check L18, L19, L21, C38, C41, R36 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9 and V10. Check stages V9 and V10 using audio signal generator. Apply audio signal across R1.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C49, C50, C51, C52, R51, R54, T6, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments A10 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or no Sound."

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, check M1, M2 and R93. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Check M1, M2 and R93. Check B+ filter and decoupling network.

TROUBLE SHOOTING AIDS (cont)

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HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V12, V13, V14 and V15. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C6, C73, R85 and other associated components.	Check L24, C64, C67, C68, C70, R81, R73, R82 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V13 and V14. Check M1 and M2. Check R85, R93, C70, T3, T5A and other associated components.

BLOOMING

Check by substitution V13, V14 and V15. Check M1 and M2. Check R85, R93, C70 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video."

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or no Sound."

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set."

KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

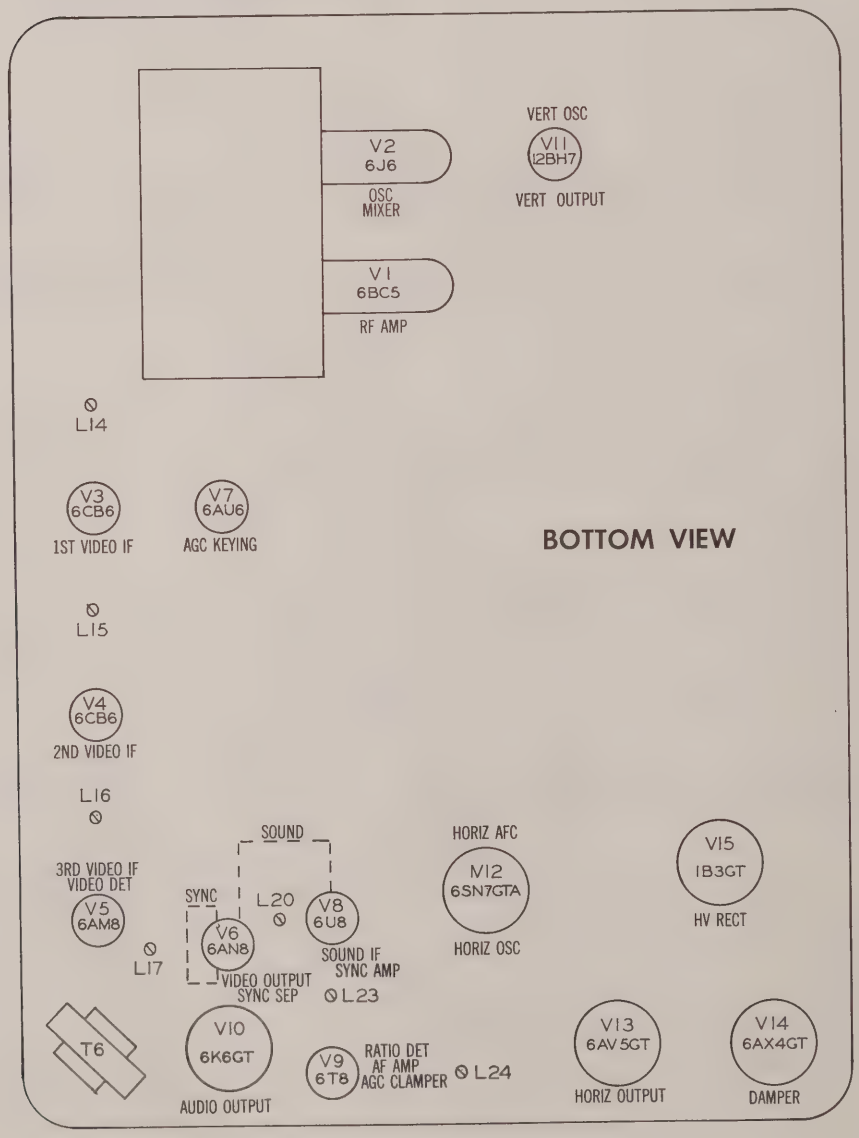
Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	600KΩ	0Ω	0Ω	.1Ω	†2. 7KΩ	†5KΩ	0Ω		
V 2	6J6	†13KΩ	†17KΩ	0Ω	.1Ω	220KΩ	15KΩ	0Ω		
V 3	6CB6	45KΩ	47Ω	0Ω	.1Ω	†3. 6KΩ	†3. 6KΩ	0Ω		
V 4	6CB6	40KΩ	47Ω	0Ω	.1Ω	†2. 6KΩ	†2. 6KΩ	0Ω		
V 5	6AM8	180Ω	.2Ω	†3. 1KΩ	.1Ω	0Ω	†3. 1KΩ	.2Ω	4. 7KΩ	0Ω
V 6	6AN8	†470KΩ	1. 8Meg	0Ω	.1Ω	0Ω	†8KΩ	†2. 1KΩ	1Meg	85Ω
V 7	6AU6	†20KΩ	†1. 3KΩ	†1. 3KΩ	†1. 3KΩ	300KΩ	▲22KΩ	†1. 3KΩ		
V 8	6U8	†6. 1KΩ	5. 2Ω	†4. 3KΩ	.1Ω	0Ω	†4. 3KΩ	560Ω	2. 2KΩ	†470KΩ
V 9	6T8	Inf.	.2KΩ	Inf.	0Ω	.1Ω	600KΩ	0Ω	4. 7Meg	†270KΩ
V 10	6K6GT	NC	0Ω	†1. 4KΩ	†1KΩ	470KΩ	TP	.1Ω	330Ω	
V 11	12BH7	▲1. 7Ω	2. 2Meg	2. 5KΩ	.1Ω	.1Ω	▲3Meg	1. 5Meg	200Ω	0Ω
V 12	6SN7GTA	1. 1Meg	†70KΩ	300KΩ	250KΩ	†40KΩ	0Ω	0Ω	.1Ω	
V 13	6AV5GT	470KΩ	0Ω	0Ω	NC	▲25Ω	NC	.1Ω	†8. 3KΩ	
V 14	6AX4GT	NC	NC	90KΩ	NC	†250Ω	NC	.1Ω	0Ω	
V 15	1B3GT	PINS	1-8	HAVE	INF	RESISTANCE				TOP CAP ▲585Ω
V 16	21XP4	0Ω	4. 7KΩ	PIN 6 0Ω	PIN 10 ▲19Ω	PIN 11 †350KΩ	PIN 12 .1Ω			

†MEASURED FROM OUTPUT OF M2.
▲MEASURED FROM PIN 3 OF V14.
NC-NO CONNECTION.
TP-TIE POINT.



TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from the chassis.
Do not remove the horizontal oscillator tube (V12) to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 4.5 volt bias supply to the ungrounded side of C5. Connect the positive lead to chassis. Remove the converter tube (V2) and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24.65MC (Unmod)	Any	DC probe thru 10KΩ to point Ⓐ. Common to chassis.	A1	Attenuate generator output to maintain not more than -2.5 volts at VTVM. Adjust for maximum deflection.
2.	"	"	25.8MC	"	"	A2	"
3.	"	"	23.5MC	"	"	A3	"
4.	"	"	24.65MC	"	"	A4	Turn A6 fully counter clockwise. Adjust A4 for maximum deflection.
5.	"	"	21.75MC	"	"	A5	Increase generator output and adjust A5 for MINIMUM deflection. Repeat steps 4 and 5.
6.	"	"	24.65MC	"	"	A6	Adjust for maximum deflection. Attenuate generator output to maintain -2.5 volts at VTVM.

OVERALL VIDEO IF RESPONSE CHECK

Attenuate sweep generator output to maintain 2 volts peak to peak on scope (.3 volt) on VTVM at point Ⓐ. If a separate marker generator is used couple it loosely to sweep output cable near ungrounded converter tube shield.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.75MC 23.25MC 23.5MC 24.65MC 25.8MC 26.25MC	Any	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Check for response curve similar to Fig. 1. If necessary, retouch A1 thru A4 and A6 to obtain desired response. Increase sweep output and use high scope gain to view 21.75MC marker. If necessary, retouch A5 to place 21.75MC marker in center of trap notch.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point Ⓑ to chassis. The junction of these two resistors is alignment point Ⓓ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.001MFD	High side to point Ⓔ. Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point Ⓑ. Common to chassis.	A7, A8, A9	Adjust for maximum deflection.
9.	"	"	"	"	DC probe to point Ⓒ. Common to point Ⓓ.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.001MFD	High side to point Ⓔ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point Ⓑ. Low side to chassis.	A7, A8, A9	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
9.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A10	Reconnect stabilizing capacitor C4. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 3. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Tune in a local TV station and inspect the picture for evidence of 4.5MC beat interference. If necessary, adjust A7 until the horizontal scanning lines are smooth and continuous.

TUNER ALIGNMENT

The tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

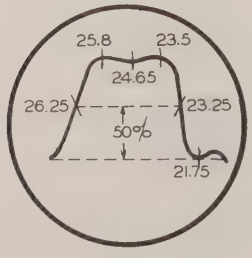


FIG. 1

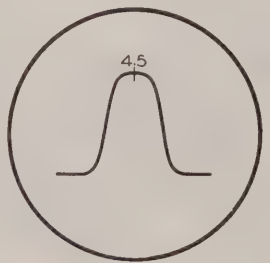


FIG. 2

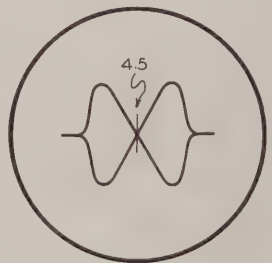
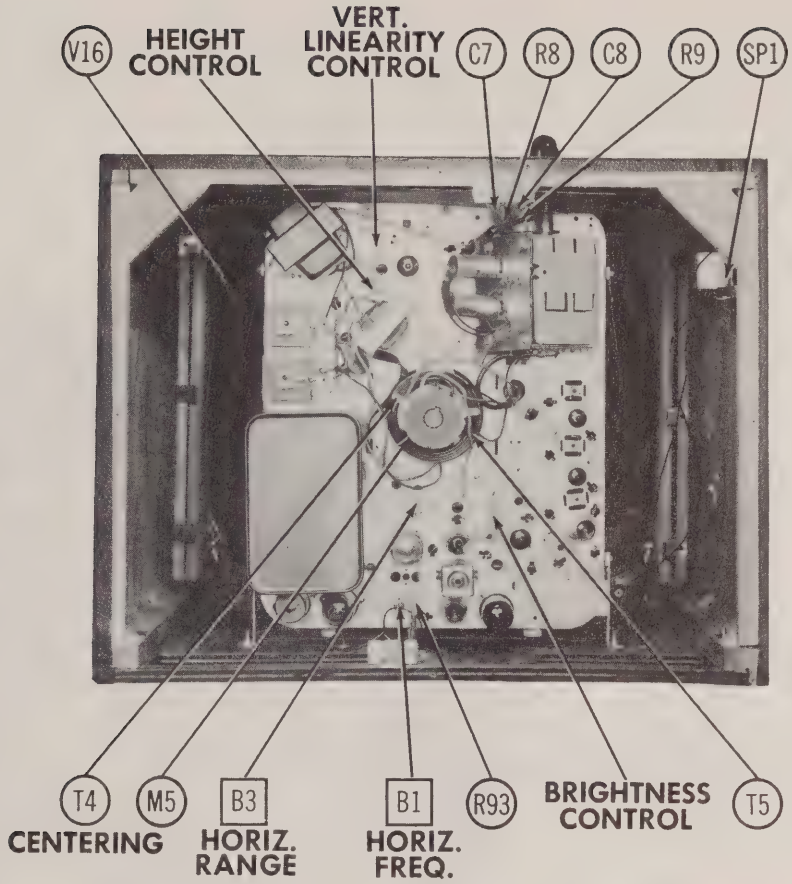


FIG. 3



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

HORIZONTAL FREQUENCY ADJUSTMENT

1. Turn the horizontal range trimmer (B3) maximum clockwise.

2. If the picture cannot be synchronized with the horizontal hold control, set the control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture is in sync. If the picture will not synchronize, turn the horizontal waveform slug (B2) several turns counter clockwise and readjust B1 until the picture synchronizes.

HORIZONTAL WAVEFORM ADJUSTMENT

Connect the vertical amplifier of oscilloscope thru a low capacity probe (See Fig. 5) to terminal "C" of L24.

If necessary, adjust B2 for waveform similar to Fig. 4, with broad and narrow peaks of equal height. Keep the picture in sync while making this adjustment with the horizontal hold control or B1. Remove scope.

HORIZONTAL RANGE ADJUSTMENT

1. Turn the horizontal hold control maximum counter clockwise. Switch off channel and back again. If the picture does not lose sync, turn B1 counter clockwise until picture loses sync when switching off channel and back again. Adjust B1 clockwise until picture just pulls into sync.

2. Turn horizontal hold control maximum clockwise. Switch off channel, then back again. If the picture does not pull into sync, turn the horizontal range trimmer (B3) clockwise until the picture pulls into sync.

3. Due to reaction between B1 and B3 it may be necessary to repeat steps 1 and 2 several times before proper synchronization is obtained. When properly adjusted, the picture should remain in sync at both extreme settings of the horizontal hold control when switching off channel and back again.

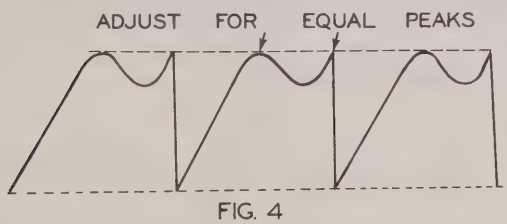


FIG. 4

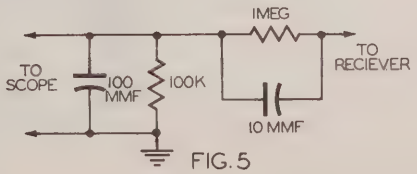
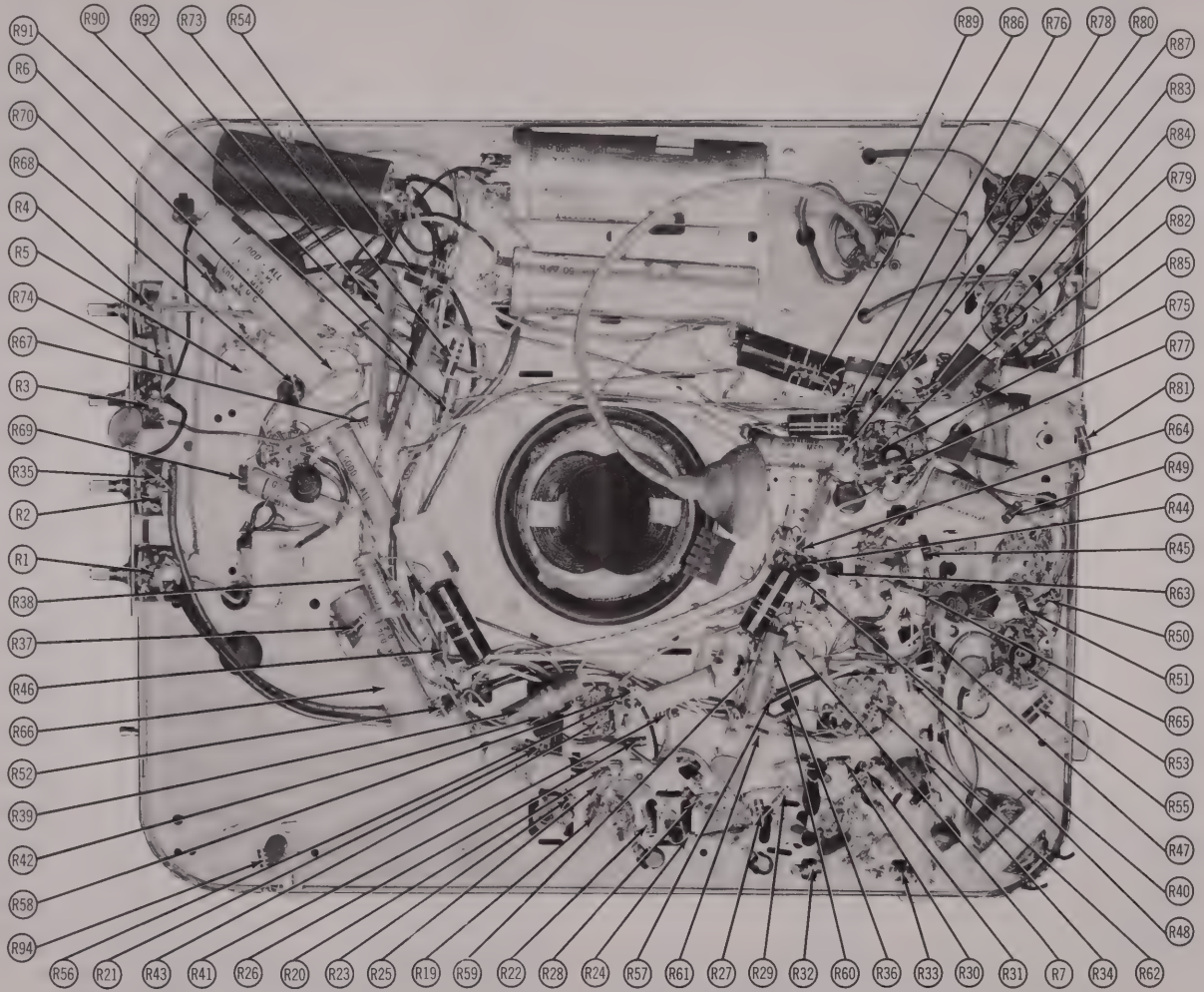
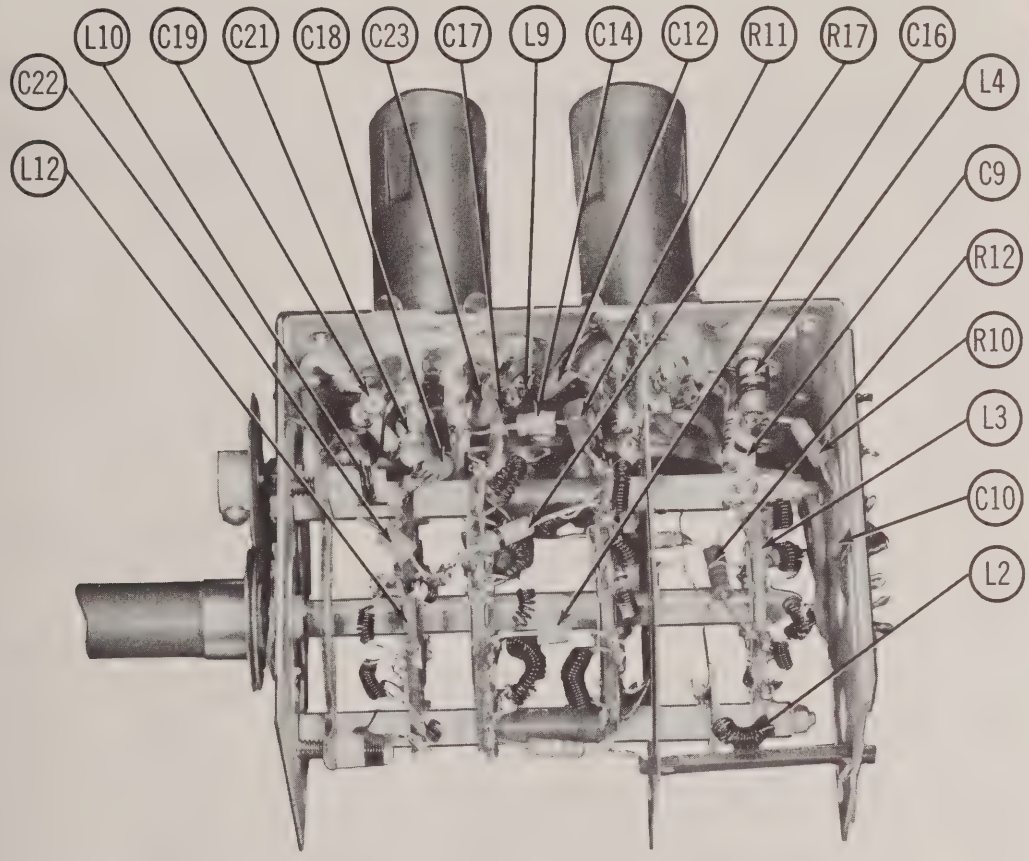


FIG. 5

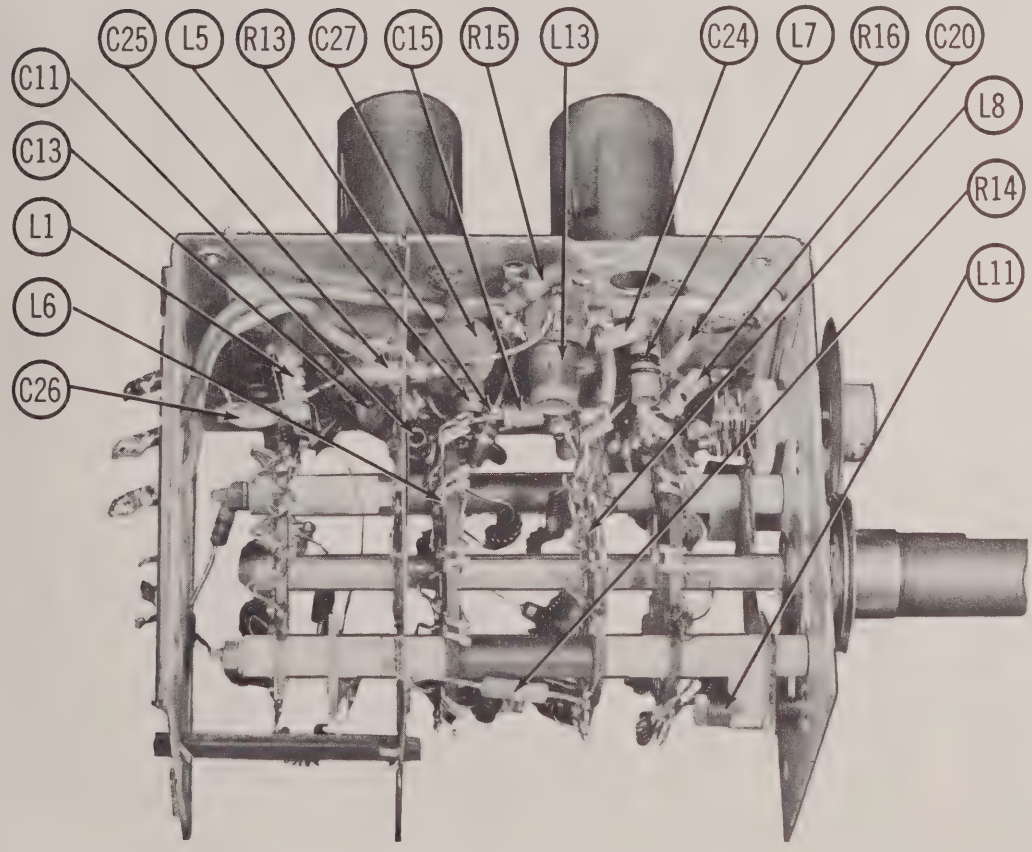


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. ET MANUFACTURING
[redacted] MONROE ST.
DENVER, COLORADO



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: METEOR PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp.	6BC5	6BC5	7BD	
V2	Mixer-Osc.	6J6	6J6	7BF	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd Video IF Amp.-Video Det.	6AM8	6AM8	9CY	
V6	Video Output-Sync Separator	6AN8	6AN8	9DA	
V7	AGC Keying	6AU6	6AU6	7BK	
V8	Sound IF Amp.-Sync Amp.	6U8	6U8	9AE	
V9	Ratio Det.-AF Amp.-AGC Clamper	6T8	6T8	9E	
V10	Audio Output	6K6GT	6K6GT	7S	
V11	Vert. Osc.-Vert. Output	12BH7	12BH7	9A	
V12	Horiz. AFC-Horiz. Osc.	6SN7GTA	6SN7GTA	8BD	
V13	Horiz. Output	6AV5GT	6AV5GT	6CK	
V14	Damper	6AX4GT	6AX4GT	6CG	
V15	HV Rect.	1B3GT	1B3GT	3C	

CATHODE-RAY TUBE

ITEM No.	METEOR PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V16	21AP4 17MP4	21AP4 21AP4A ① 17MP4, 17MP4	21AP4A ① 17MP4, 17MP4	21AP4 21AP4A ② 17MP4 17MP4 17MP4B-2	17MP4, 17MP4	12L 12L 12L	① Aluminized ② Silver Screen

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: METEOR PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1	150	150	T18-333			FP1U7	TM-150-150	S-105	
C2A	a150	150	T18-333			FP1U7	TM-150-150	S-105	
B	a50	90				TC39	TD-50-90	*TM-5550	
C2A	a100	300	T18-333				TM-4121	T-110	
B	20	300						MTD-3520	
C	a20	300							
D	a30	300							
C4	4	90	T18-392			TC30	TD-4-50	MMT-0505	
C5	4	90	T18-392			TC30	TD-4-50	MMT-0505	
C6	10	300	T18-335			TC62	TD-10-350	FM-3512	
C7	500	1000	T15-304	DD-501	IR5KY-471	DC30347			
C8	500	1000	T15-304	DD-501	IR5KY-471	DC30347			
C9	18			DS-150	GP2K-150	DC-5415			
C10	800			DD-801	S31-801	DC-531			
C11	470			DS-471	GP2K-471	DC-5347			
C12	800			DD-801	S31-801	DC-531			
C13	800			DD-801	S31-801	DC-531			
C14	.18								
C15	.56								
C16	1.5								
C17	470			D5-471	GP2K-471	UC-5347			
C18	.24								
C19	4								
C20	13			TCZ-12	NP0K-120				
C21	10			TCN-10	N750A-100	NT-541			
C22	.56								
C23	800			DD-801	S31-801	DC-531			
C24	15			D5-150	GP1K-150	DC-5415			
C25	91								
C26	120			DD-121	S1L-121	UC-5312			
C27	5000			DD-502	S1L-502	DC-533	MT2-3	KR-1447	
C28	2.0	300	T18-387					C-1250	
C29	47			TCZ-47	NP0-338-470	ZT-5447		KR-1447	
C30A	5000		T15-304	DD3-503	S1L-005	DC-525		C-1250	
B	5000				S1L-005	DC-525		C-1250	
C31	680		T15-390	DD-681	S1L-681	UC-5368		K-1368	
C32A	5000		T15-304	DD3-503	S1L-005	DC-525		C-1250	
B	5000				S1L-005	DC-525		C-1250	
C33	680		T15-390	DD-681	S1L-681	UC-5368		K-1368	
C34	680		T15-390	DD-681	S1L-681	UC-5368		K-1368	
C35A	5000		T15-304	DD3-503	S1L-005	DC-525		C-1250	
B	5000				S1L-005	DC-525		C-1250	
C36	5000		T18-177	DD-503	S1L-005	DC-525		C-1250	
C37	10		T18-351	TCZ-10	NP0A-100	ZT-541		KR-1410	
C38	5000		T18-177	DD-503	S1L-005	DC-525		C-1250	Note 1
C39	33								
C40	33								
C41	.047	600	T18-447	DF-503		PT4147	IMP4-847	3304147	
C42	.022	600	T18-348	DF-303	S17-03	PT4123	IMP4-823	3304123	
C43	270	1000	T15-389	DD-271		MCE327		K-3327	
C44	82	4000	T15-387	DD90-820				K-4482	
C45	1000		T15-230	DD-102	S01-001	DC-521		K-1210	
C46A	5000		T15-304	DD3-503	S1L-005	DC-525		C-1250	
B	5000				S1L-005	DC-525		C-1250	
C47	5		T15-232	TCZ-4R7	NP0A-050	ZT-555		KR-1550	
C48	560		T15-302	DD-561	S1L-561	UC-5356		K-1356	
C48A	5000		T15-304	DD3-502	S1L-005	DC-525	IMP6-D5	C-1250	
B	5000				S1L-005	DC-525	IMP6-D5	C-1250	
C50	5000		T18-177	DD-503	S1L-005	DC-525	IMP6-D5	C-1250	
C51	5000		T18-177	DD-503	S1L-005	DC-525	IMP6-D5	C-1250	
C52	5000		T18-177	DD-503	S1L-005	DC-525	IMP6-D5	C-1250	
C53	.022	400	T15-346	DF-303	S17-03	PT4123	IMP4-823	3304123	
C54	180		T15-396	TCN-180	N750-537-181	MCE336		KR-1315	

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: METEOR PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C55A	2000					DC-523	IMP6-D3	C-1230	
B	5000		*T17-109	*PC-104	*1405-01	DC-525	IMP6-D5	C-1250	
C	5000					DC-525	IMP6-D5	C-1250	
C56	0047	600	T18-253	D5-472	GP3-333-472	PT5247	IMP6-D47	3305247	
C57	5000		T18-177	DD-503	S1L-005	DC-525	IMP6-D5	C-1250	
C58	47	600	T18-249			PT5047	IMP6-P47	3305047	
C59	047	400	T18-345	DF-503		PT4147	IMP4-847	3304147	
C60	.1	400	T18-384	DF-104		PT401	IMP4-P1	330401	
C61	047	400	T18-245	DF-503		PT4147	IMP4-847	3304147	
C62	180	500	T18-300	D6-181	S1L-181	MCE337		KR-1318	
C63	2000		T15-238	DD-202	S01-002	DC-522	IMP6-D2	C-1220	
C64	047	400	T18-245	DF-503		PT4147	IMP4-847	3304147	
C65	022	200	T18-363	DF-303	S17-03	PT4123	IMP4-S23	3304123	
C66	22	200	T18-353			PT4022	IMP4-P23	3304022	
C67	390	500	T15-373	D6-391	S1L-391	MCE243		KR-1339	
C68	01	600	T18-252	D6-103	GP3-333-103	PT611	IMP6-E1	330611	
C69	0033	500	T15-388			MCE255		KR-1310	
C70	.0047	600	T18-253	D6-472	GP3-333-472	PT5247	IMP6-D47	3305247	
C71	47	500	T15-339	D6-470	GP1K-470	MCE25		K-1447	
C72	100		T15-283	DD-101	S01-101	UC-531		K-1310	
C73	047	400	T18-245	DF-503		PT4147	IMP4-847	3304147	
C74	56	3000		DD30-560	5KV-560	DC30456			
C75	5000	1000	T15-305	DD-502	1KSKV-472				
C76	5000	1000	T15-305	DD-502	1KSKV-472				

Note 1. Some versions use 58MMF in this application.
* Items C55A, C55B, C55C, R68A, R68B and R68C are combined in one unit.

CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: METEOR PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	T24-231	Q13-133	A47-500K-Z	BSX-50-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSH-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	76-1	SWE-12	Not Req.	U8-38	Attach to R1A.
R2A	3000	½	T25-41	QU-103	A47-500-S	AB-3		Contrast
B	Shaft		Not Req.	Not Req.	KSH-3	AK-4		Attach to R2A.
R3A	1.2Meg	½	T25-44	QU-126	A47-1.5Meg-S	AB-69	U-155	Vertical Hold
B	Shaft		Not Req.	Not Req.	KSH-3	AK-4	Not Req.	Attach to R3A.
R4A	500KΩ	½	T25-43	QU-123	A47-500K-S	AB-31	U-35	Horizontal Hold
B	Shaft		Not Req.	Not Req.	KSH-3	AK-4	Not Req.	Attach to R4A.
R5A	2500Ω	½	T25-45	QU-12	A47-250Ω-S	AB-7	SU-8	Vertical Linearity
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R5A.
R6A	5Meg	½	T25-47	QU-141	A47-4Meg-S	AB-88	TA56L	Height has 1Meg stop-See Note 1.
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R6A.
R7A	300KΩ	½	T25-40	QU-128	A47-300-S	AB-40	TA15L	Brightness
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R7A.

Note 1. Connect a 1Meg resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: METEOR PART No.	IRC PART No.	NOTES
R8	470KΩ	½	S804748	BTS-470K	
R9	470KΩ	½	S804748	BTS-470K	
R10	15KΩ	½		BTS-15K	
R11	2200Ω	½		BTS-2200	
R12	2200Ω	½		BTS-2200	
R13	470Ω	½		BTS-470	
R14	220KΩ	½		BTS-230K	
R15	15KΩ	½		BTS-15K	
R16	15KΩ	½		BTS-15K	
R17	10KΩ	½		BTS-10K	
R18	100Ω	½		BTS-100	Note 1
R19	8200Ω	½	S808220K		
R20	1000Ω	½	S801030K	BTS-1000	
R21	220KΩ	½	S802340K	BTS-230K	
R22	12KΩ	½	S801230K		
R23	470Ω	½	S804700K	BTS-47	
R24	1000Ω	½	S801020K	BTS-1000	
R25	39KΩ	½	S803930K	BTS-39K	
R26	1000Ω	½	S801020K	BTS-1000	
R27	27KΩ	½	S802730K		
R28	47Ω	½	S804700K	BTS-47	
R29	470Ω	½	S804710K	BTS-470	
R30	1000Ω	½	S801030K	BTS-1000	
R31	18KΩ	½	S801830K		
R32	180Ω	½	S808180K	BTS-180	
R33	47KΩ	½	S804730K		
R34	1Meg	½	S801050K		
R35	56Ω	½	S805610K	BTS-560	
R36	68000Ω	2	S806822K		
R37	4700Ω	½	S804720K		
R38	4700Ω	½	S804720K		
R39	22KΩ	2	S802232K	BTB-22K	
R40	270KΩ	½	S802740K		
R41	330KΩ	½	S803230K		
R42	47KΩ	½	S804731K		
R43	470KΩ	½	S804730K	BTS-47K	
R44	2200Ω	½	S802220K	BTS-2200	
R45	560Ω	½	S805561K	BTS-560	
R46	2Meg 5%	½	S802050J	BTS-2 Meg 5%	Note 2
R47	330Ω	½	S803310K	BTS-330	
R48	22KΩ	½	S802230K	BTS-22K	
R49	12KΩ	½	S801230K	BTS-12K	
R50	4.7Meg	½	S804750K	BTS-4.7Meg	
R51	270KΩ	½	S802740K	BTS-270K	
R52	470KΩ	½	S804740K	BTS-470K	
R53	470KΩ	½	S804740K	BTS-470K	
R54	1000Ω	2	S801022K	BTB-1000	
R55	330Ω	1	S803311K	BTA-330	
R56	390KΩ	½	S803940K	BTS-390K	
R57	100KΩ	½	S801040K	BTS-100K	
R58	39KΩ	½	S803850K	BTS-39K	
R59	15KΩ	½	S801530K	BTS-15K	
R60	1.5Meg	½	S801550K	BTS-1.5Meg	
R61	270KΩ	½	S802740K	BTS-270K	
R62	470KΩ	½	S804740K	BTS-470K	
R63	1000Ω	½	S801030K	BTS-1000	
R64	3200Ω	½	S803230K	BTS-230	
R65	2300Ω	½	S803230K	BTS-2200	
R66A	25KΩ	½		BTS-25K	
B	8200Ω	½	*T17-109	BTS-8200	
C	8200Ω	½		BTS-8200	
R67	1Meg	½	S801050K	BTS-1Meg	
R68	1Meg	½	S801050K	BTS-1Meg	
R69	2.2Meg	½	S802250K	BTS-2.2Meg	
R70	1500Ω	½	S801520K	BTS-1500Ω	
R71	680Ω	½			
R72	560Ω	½			
R73	68KΩ	½	S806831K		
R74	100KΩ	½	S801041K		
R75	820KΩ	½	S808340K		
R76	8200Ω	½	S808220K		
R77	2.7Meg	½	S802751K		
R78	150KΩ	½	S801541K		
R79	100KΩ	½	S801041K		
R80	150KΩ	½	S801541K		
R81	8200Ω	½	S808220K		
R82	39KΩ	½	S803931K		
R83	150KΩ	½	S801540K		
R84	470KΩ	½	S804740K		
R85	8200Ω	2	S808222K		
R86	100KΩ	½	S801040K		
R87	10KΩ	½	S801030K		
R88	1000Ω	½			
R89	2.7Ω	1	T60-972	BTS-2.7	
R90	250Ω	10	T93-5	PW10-250	
R91	1000Ω	1	S801021K	BTA-1000	
R92	2100Ω	15	T91-7		
R93	7.5Ω	5	S431007		
R94	470KΩ	½	S804740K	BTS-470K	

Note 1. Not used in some versions.
Note 2. Some versions use a 3.3Meg, ½ watt in this application.
* Items C55A, C55B, C55C, R68A, R68B, R68C are combined in one unit.

TRANSFORMER (FILAMENT)

ITEM No	RATING: PRI.	SEC 1	SEC 2	REPLACEMENT DATA: METEOR PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC	6.3VAC @ .6A	6.3VAC @ 7.5A	80-316						

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	METEOR PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Rom PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert. Osc. Trans.	T90-317	B-8708②	A-3003③	209T1 ①	V40S ①	A-8125①	26A03 ①	A-97X①
T3	Horiz. Output Trans.	T90-320	PM41D *	230T1D *	X08D ①	A-8285① *		P1-24 *	D-19X①
T4	Vert. Output Trans.	T90-318	21B08①	A-3039①	226TX①	V32D①	A-8141	26S54①	A-104X①
T5A	Yoke-Horiz. (DAMD)	T70-692	DF605①	MDF-75	222D1②③	Y70P35	DY-15A②	Y-10②	Y-19-1
B	Vert. (DSMD)			④⑤		①②	①	②	②②

① Drill new mounting hole(s).
② Use original yoke cover and centering device.
③ Use original horizontal yoke damping network if necessary.
④ Connect horizontal damping network across terminals #3 and #7, use original network if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rom Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4	9	9	9	9	9	9	9
3	8	8	8	7 & 8	8	8	8 & 7
2	5	5	5	5	5	5	5
1	1	1	1	1	1	1	1

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: METEOR PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T6	5 mKΩ	3.2Ω	80-318	Z1000①	A-3038	A-3878①	22S47	S-8X	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V C	IMP	REPLACEMENT DATA: METEOR PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3.2Ω		79-429	4A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	REPLACEMENT DATA: METEOR PART No.	MUSSINER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Antenna Trap							
L2	Antenna Coil	0Ω						Channel 6
L3	Antenna Coils	0Ω						
L4	Antenna Coil	0Ω		1984-6				
L5	RF Coil	0Ω		1984-17				Channel 13
L6	RF Coils	0Ω						
L7	Mixer Grid Coil	0Ω		1984-18				Channel 13
L8	Mixer Grid Coils	0Ω						
L9	Pri. Choke	0Ω		1785-47				
L10	Osc. Coil	0Ω						Channel 13-Tapped
L11	Osc. Coil	0Ω						Channel 6
L12	Osc. Coils	0Ω						
L13	Conv. Plate	.3Ω		1790-30				
L14	1st Video IF	.3Ω		1790-870			6346	Includes 2I, 7SMC Trap
L15	2nd Video IF	.2Ω	.2Ω	T10-872	17-1083	TV-126	6349	
L16	3rd Video IF	.2Ω	.2Ω	T10-873	17-1084	TV-116	6350	
L17	4th Video IF	.2Ω	.2Ω	T10-875		TV-100*	6186a	
L18	Series Peaking Coil	8Ω		T10-876	19-1235		6353	130 Microhenries
L19	Shunt Peaking Coil	11Ω		T10-590	19-3250	TV-125	6130	269 Microhenries
L20A	4.5MC Trap	5.2Ω		T10-874				
B	Sound IF	5.3Ω						
L21	Series Peaking Coil	9.5Ω		T10-871	19-1250	TV-125a	6173	220 Microhenries; Wound on 32KΩ Resistor.
L22	Shunt Peaking Coil	11Ω		T10-590	19-3250	TV-125	6130	269 Microhenries
L23	Ratio Det.	2.7Ω	.3SCT	T10-558	17-1033a	TV-110a	1466a	Tertiary Windings, 8Ω
L24	Horiz. Osc.	22Ω	5Ω	T10-869	20-1402	TV-162	6183	Waveform Winding-52Ω

*Cut out chassis hole & drill mounting holes.
■Cut out chassis hole & drill mounting holes-Deluxe trap.
▲Parallel with 22KΩ resistor.
●Drill mounting holes & disconnect cap. across primary.

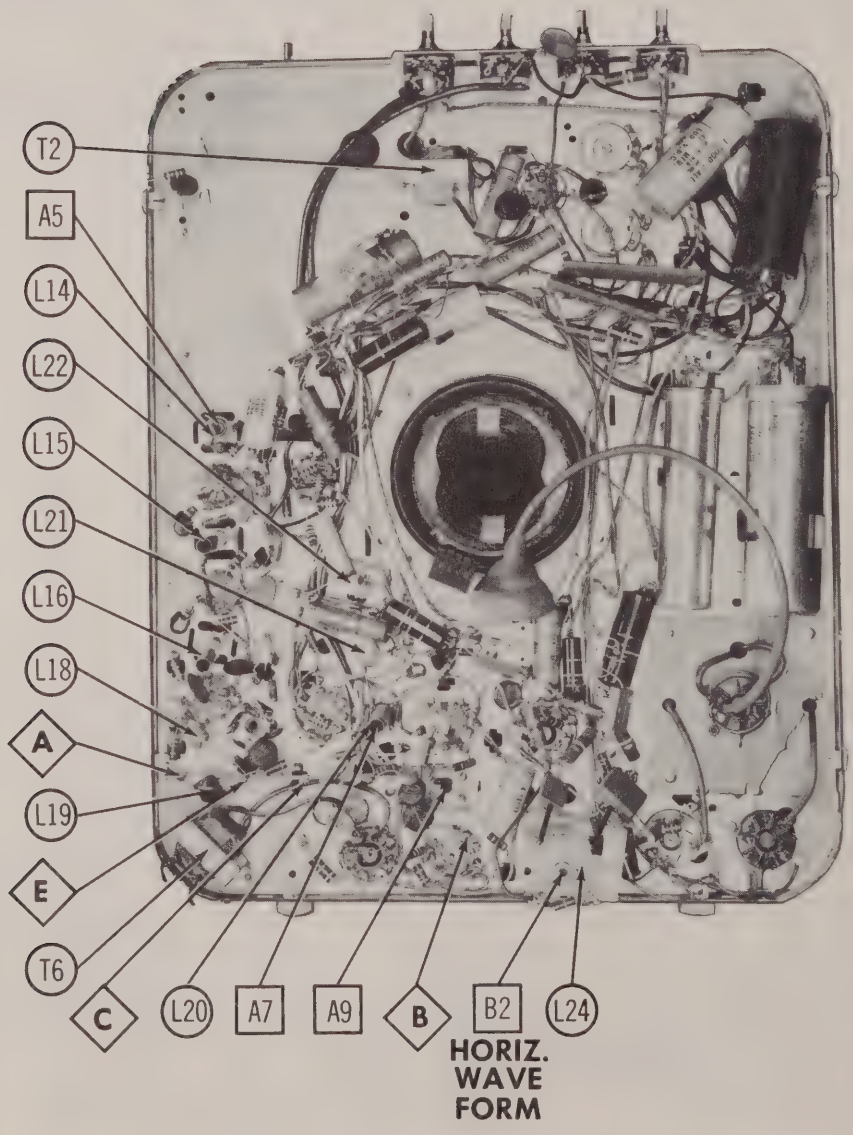
PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	METEOR PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.220ADC	83-829	1090A	MR-300	6S300	6Q4	300	
M2	.220ADC	83-829	1090A	MR-300	6S300	6Q4	300	

MISCELLANEOUS

ITEM No.	PART NAME	METEOR PART No.	NOTES
M3	Tuner	T95-42	VHF
M4	Centering Device		Part of deflection yoke rear cover (TS)
M5	Ion Trap	T83-830	
B3	Trimmer Cap.	T20-152	Horiz. Range (25-280MMF)
	Cabinet	T42-719	Model 4109A
	Cabinet	T42-720	Model 4103A
	Knob	T52-547	Channel Selector
	Knob	T52-546	Fine Tuning
	Knob	T52-465	On-Off-Volume
	Knob	T52-466	Contrast
	Knob	T52-464	Vert. Hold
	Knob	T52-467	Horiz. Hold
	Safety Glass	T48-89	Model 4109A
	Safety Glass	T48-88	Model 4103A
	Mask	T31-286	Model 4109A
	Mask	T31-287	Model 4103A



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to the set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug of L24 until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L23) located on top of chassis. (See tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

1. Remove 6 push-on type control knobs from top panel of cabinet.
2. Disconnect built-in antenna.
3. Remove 8 wood screws. Remove rear cover.
4. Disconnect speaker leads.
5. Remove 2 wood screws. Remove antenna terminal strip.
6. Remove 6 cabinet mounting bolts. Lift cabinet up and off.
7. Remove 2 speaker nuts. Remove speaker.

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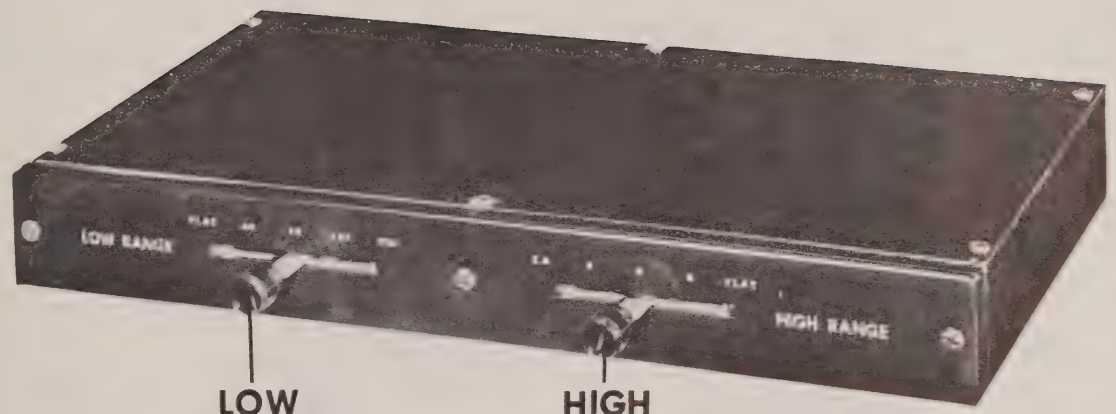
CRAFTSMEN
MODEL C375



LOW RANGE SWITCH

HIGH RANGE SWITCH

CRAFTSMEN
MODEL C375

TRADE NAME	Craftsmen Model C375
MANUFACTURER	The Radio Craftsmen, Inc., 4401 N. Ravenswood Ave., Chicago 40, Ill.
TYPE SET	AC Operated Sharp Cut-Off Filter
TUBES (Three)	Types 6AV6 AF Amp., 12AX7 Cathode Follower, 6X4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.05 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

CRAFTSMEN
Model C375

PARTS LIST AND DESCRIPTIONS (Continued)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		CRAFTSMEN PART No.	STANDARD REPLACEMENT		
V1	AF Amp.	6AV6	6AV6	7BT	
V2	Cathode Follower	12AX7	12AX7	9A	
V3	Rectifier	6X4	6X4	5BS	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	CRAFTSMEN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .05A	422VCT .006ADC	6.3VCT @ 1.03A		52A001					

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	CRAFTSMEN PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■20	350				FP227	TM-D20-350	D-160	
B	▲20	350							
C2	20	400				TC75	TD-20-450	FM-4520	
C3	.1	200							
C4	56	500		TCZ-56	NPO-337-560			KR-1456	
C5	200	500		TCZ-200	NPO-334-201	MCE237		KR-1320	
C6	.1	400							
C7	1000	500				MCE255		KR-1210	
C8	510	500						KR-1351	
C9	.047	400							
C10	.22	400							
C11	.018	400						CR-1230	
C12	.003	400							
C13	.0015	1000			811-152	MCB255		CR-1215	
C14	.039	400							
C15	820	500						KR-1382	
C16	510	500						KR-1351	
C17	.047	400							
C18	.047	400							
C19	.22	400							
C20	47	200				PT4047	CT2-P5	3302047	
C21	.1	200							

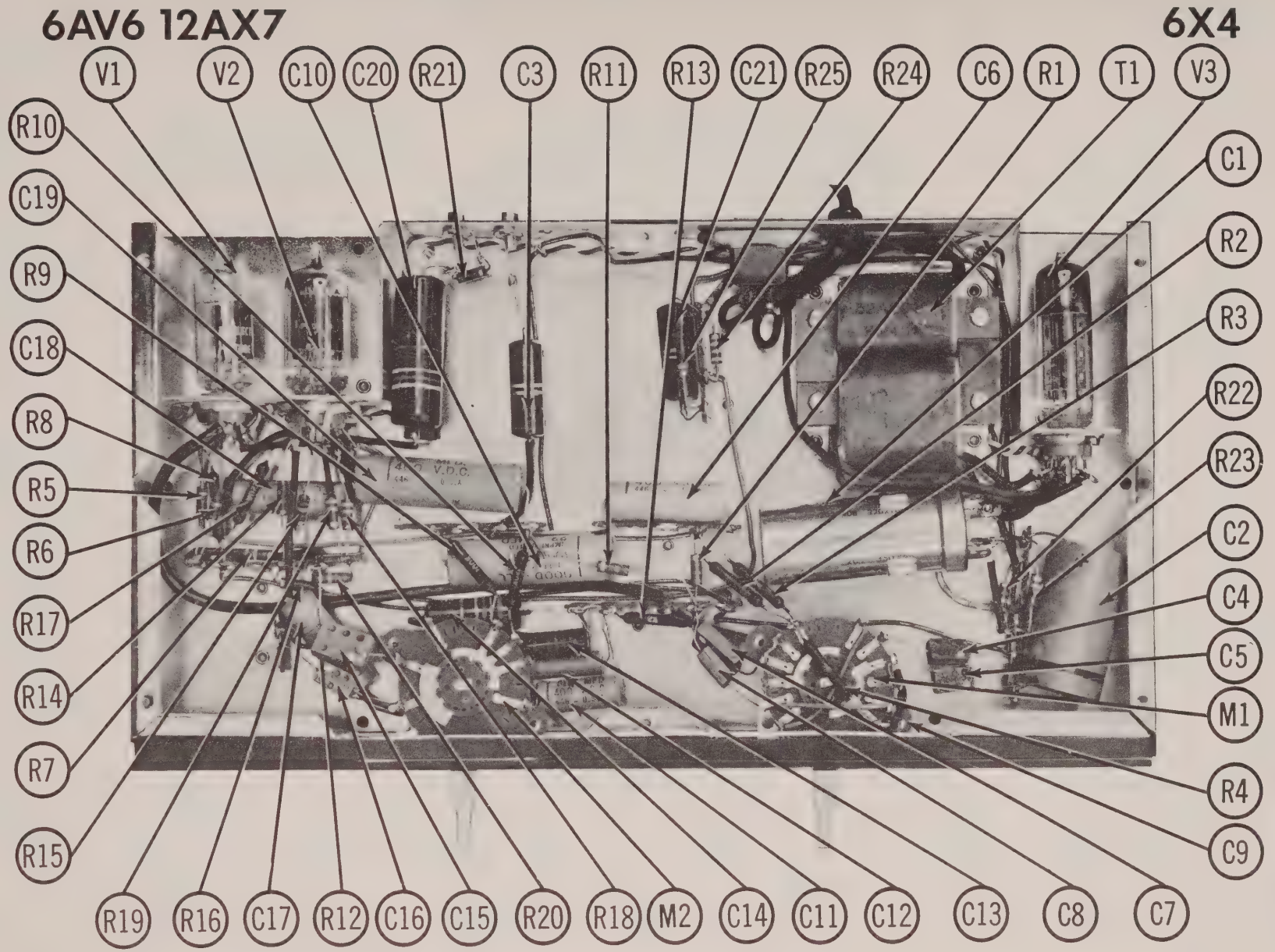
MISCELLANEOUS

ITEM No.	PART NAME	CRAFTSMEN PART No.	NOTES
M1	Switch	62S018	Treble (High Range) 5 Position
M2	Switch	62S019	Bass (Low Range) 5 Position
	Knob	15A052	2 Used

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CRAFTSMEN PART No.	IRC PART No.	
R1	2.2Meg	1/2		BTS-2.2Meg	
R2	220KΩ 2%	1/2		DCC-220K	
R3	220KΩ 2%	1/2		DCC-220K	
R4	220KΩ 2%	1/2		DCC-220K	
R5	1Meg	1/2		BTS-1Meg	
R6	1800Ω	1/2		BTS-1800	
R7	3900Ω 5%	1/2		BTS-3900 5%	
R8	100KΩ 2%	1/2		DCC-100K	
R9	100KΩ 2%	1/2		DCC-100K	
R10	180KΩ 2%	1/2		DCC-180K	
R11	2.2Meg	1/2		BTS-2.2Meg	
R12	1Meg 5%	1/2		BTS-1Meg 5%	
R13	150KΩ 2%	1/2		DCC-150K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CRAFTSMEN PART No.	IRC PART No.	
R14	1Meg 5%	1/2		BTS-1Meg 5%	
R15	2700Ω	1/2		BTS-2700	
R16	10K 5%	1/2		BTS-10K 5%	
R17	220KΩ 2%	1/2		DCC-220K	
R18	470KΩ	1/2		BTS-470K	
R19	470Ω	1/2		BTS-470	
R20	22KΩ	1/2		BTS-22K	
R21	1Meg	1/2		BTS-1Meg	
R22	4700Ω	1/2		BTS-4700	
R23	10KΩ	1/2		BTS-10K	
R24	470KΩ	1/2		BTS-470K	
R25	100KΩ	1/2		BTS-100K	



CHASSIS BOTTOM VIEW

CRAFTSMEN
Model C375

SET 293 FOLDER 10

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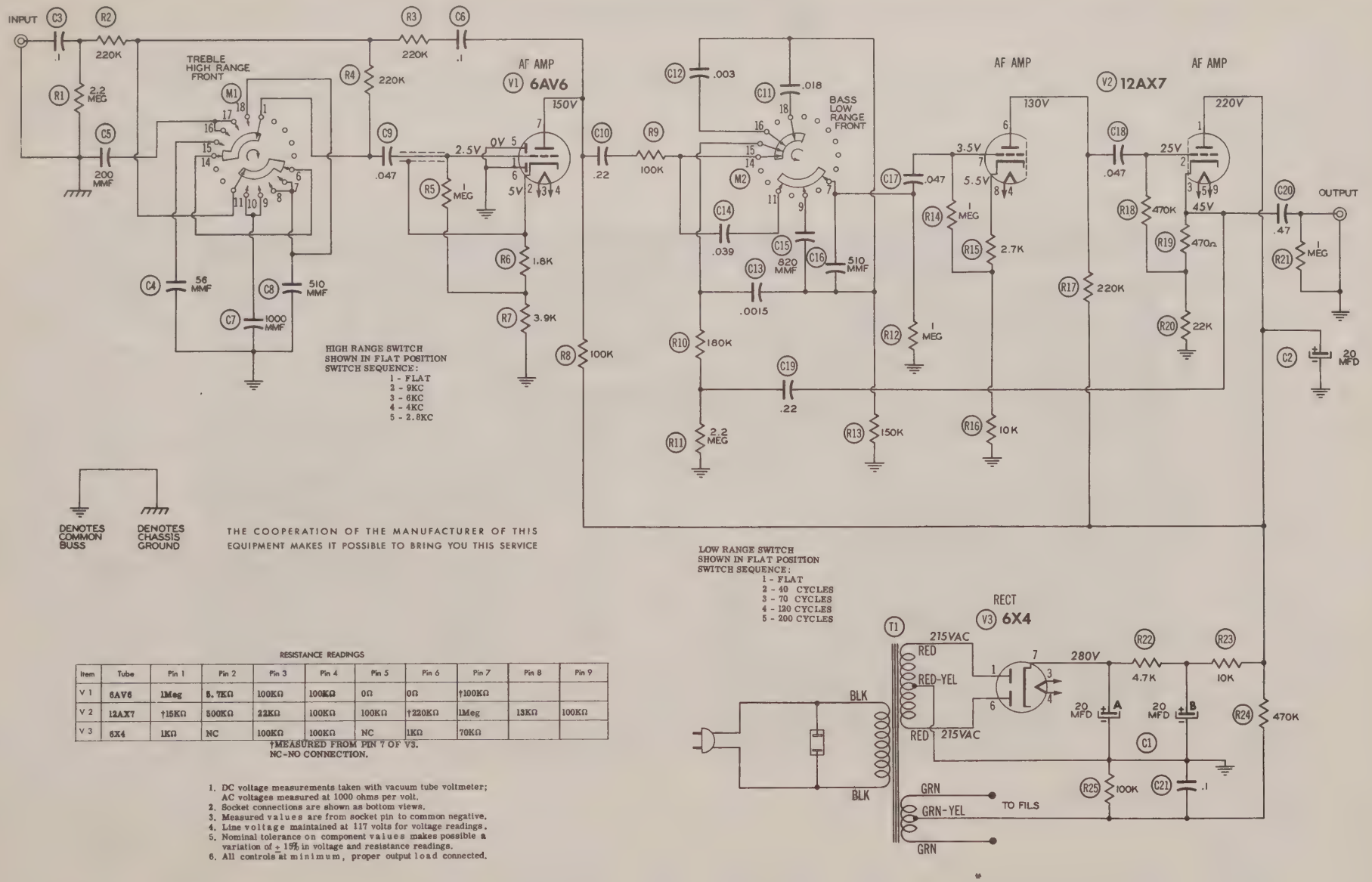

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AV6	1Meg	5.7KΩ	100KΩ	100KΩ	0Ω	0Ω	†100KΩ		
V 2	12AX7	†15KΩ	500KΩ	22KΩ	100KΩ	100KΩ	†220KΩ	1Meg	13KΩ	100KΩ
V 3	6X4	1KΩ	NC	100KΩ	100KΩ	NC	1KΩ	70KΩ		

†MEASURED FROM PIN 7 OF V3.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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TRUETONE MODEL 2D2427A

MODEL 2D2427A

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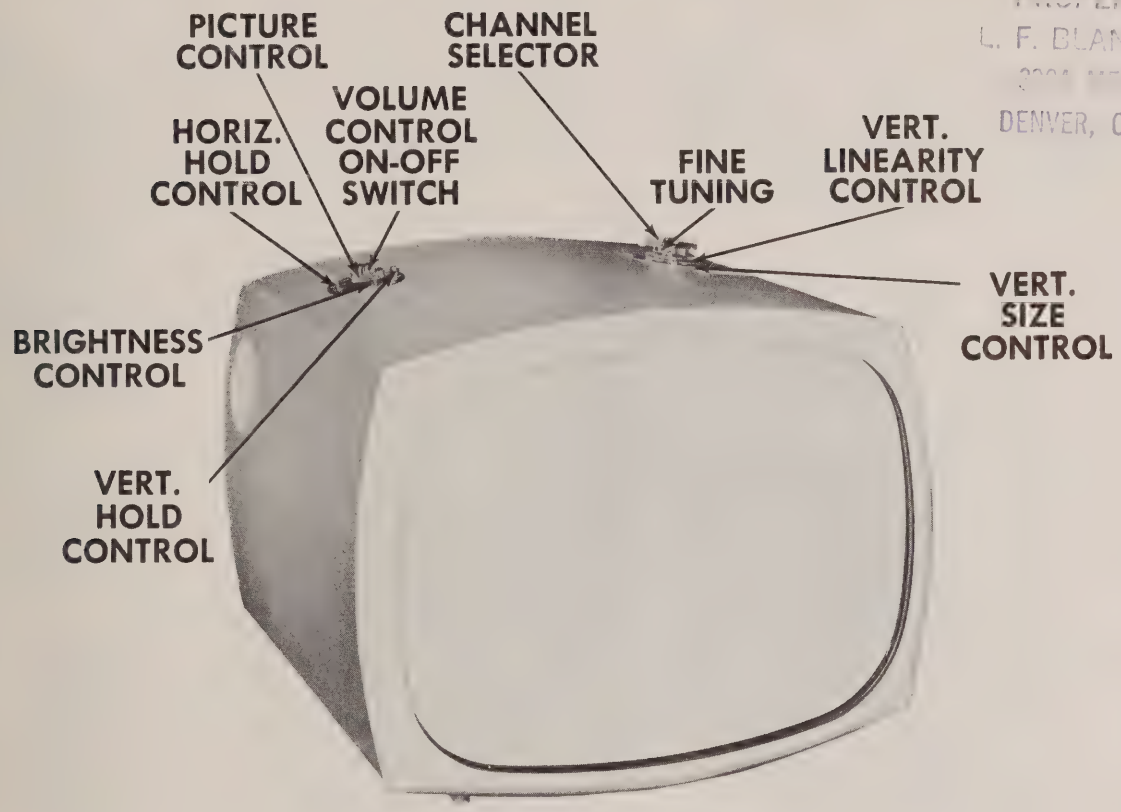

TRUETONE MODEL 2D2427A

TRADE NAME	Truetone Model 2D2427A
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Television Receiver
TUBES	Sixteen
POWER SUPPLY	105-115 Volts AC-60 Cycles RATING 1.35 Amp. @ 115 Volts AC
TUNING RANGE-	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 46.75MC, Sound IF 42.25MC (Intercarrier)

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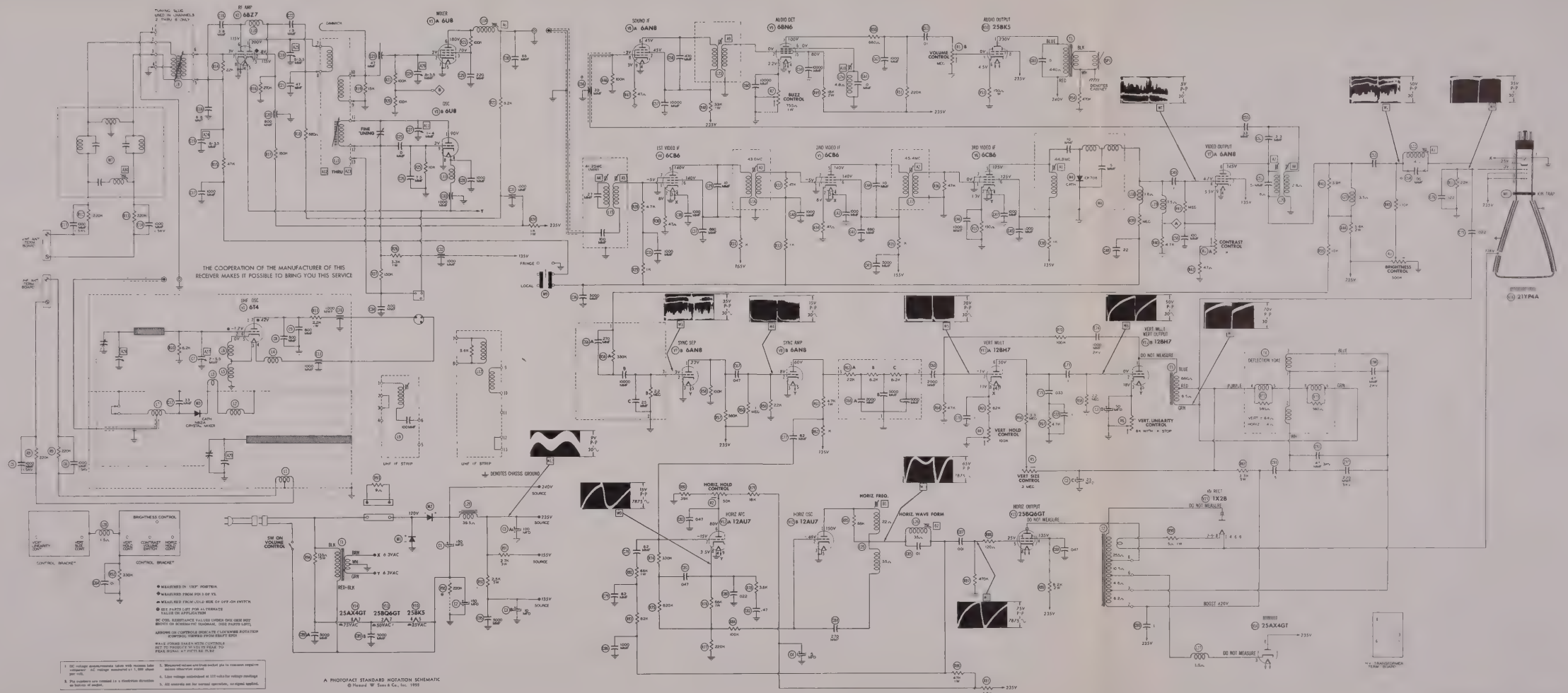
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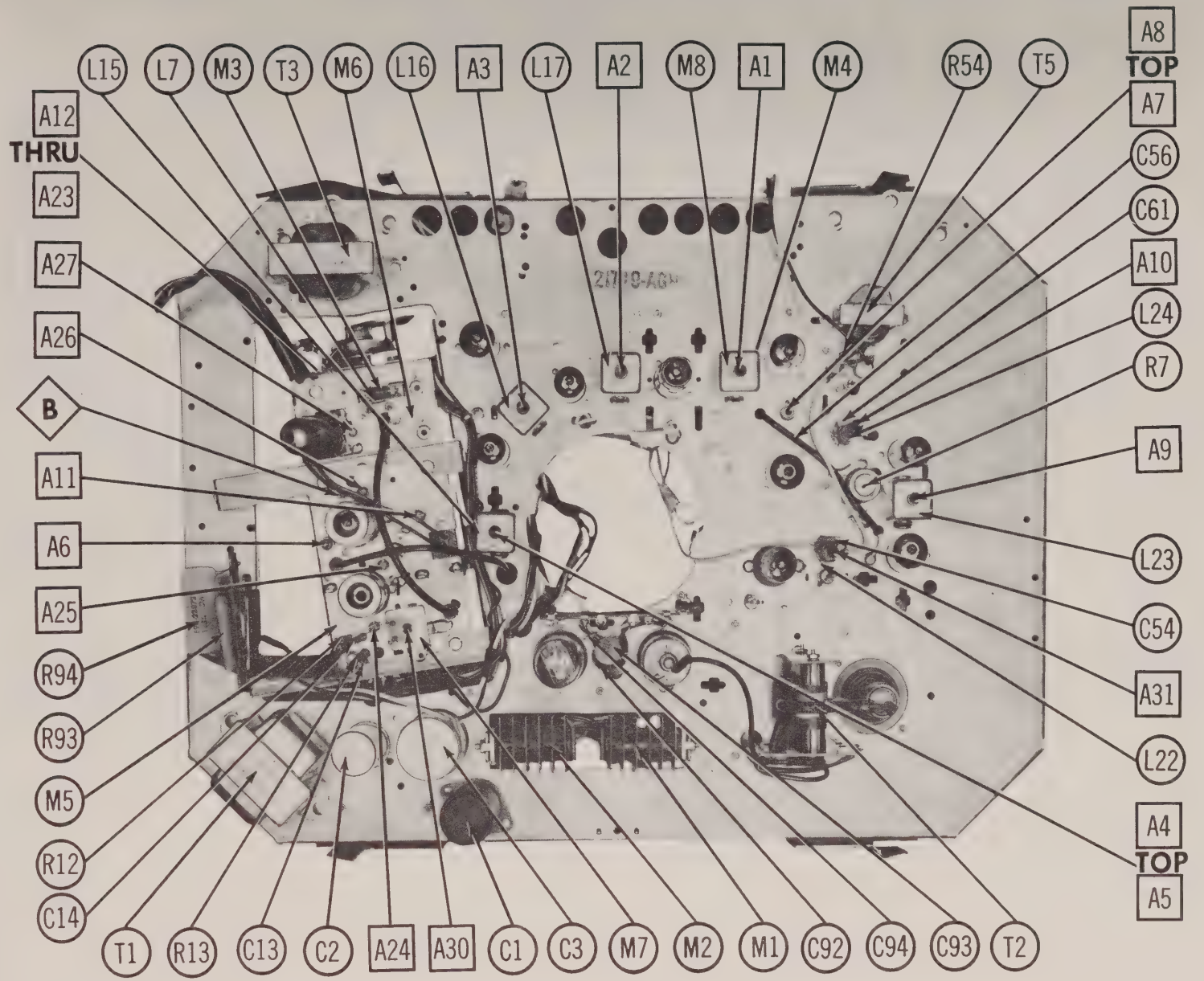

CHASSIS TOP VIEW

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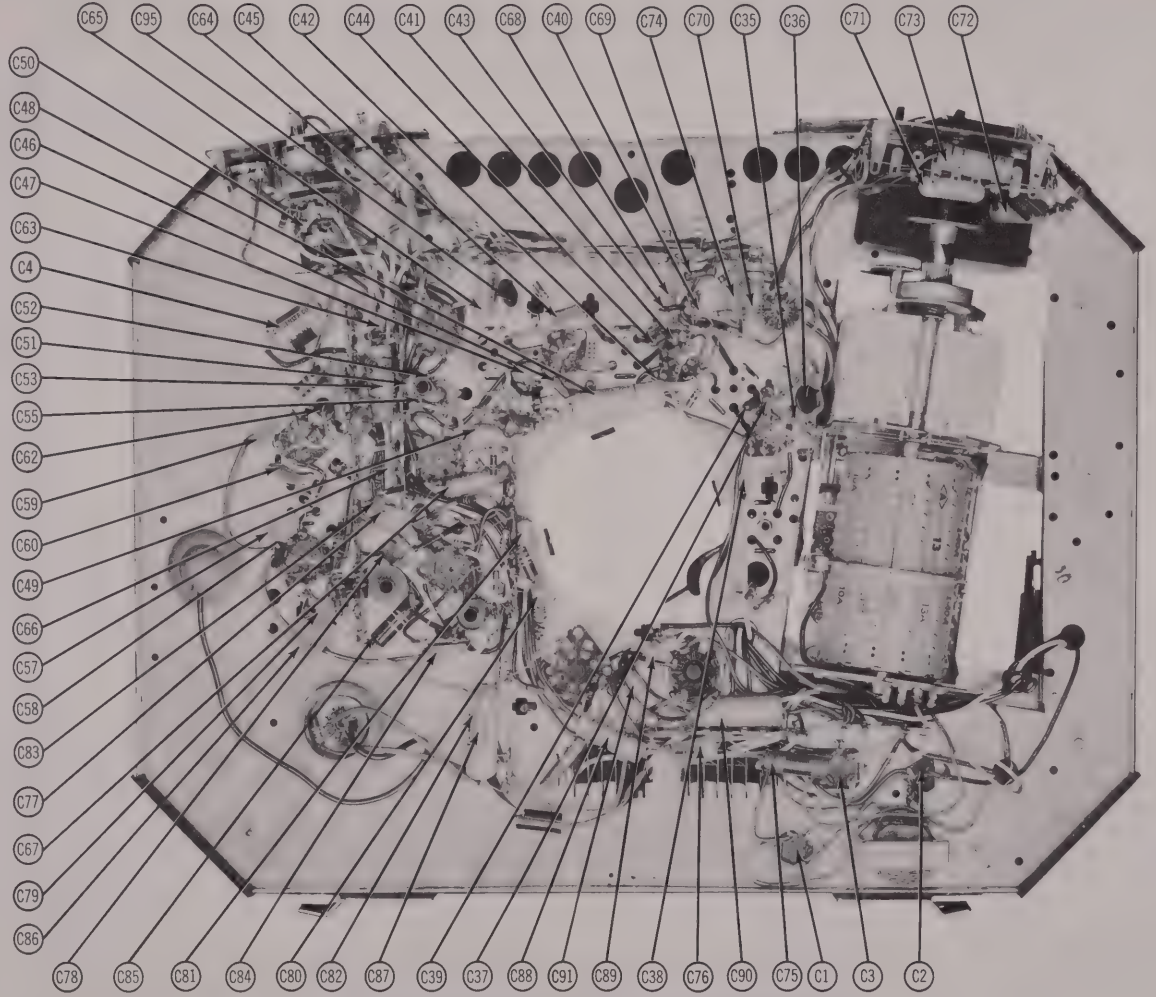

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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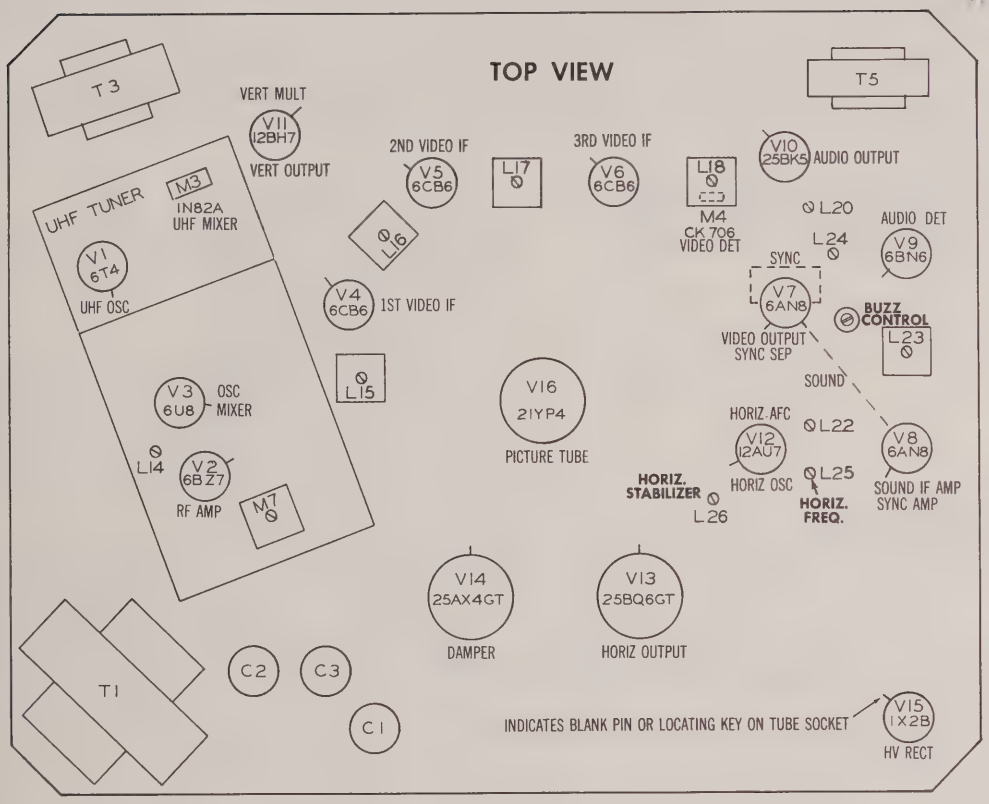
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

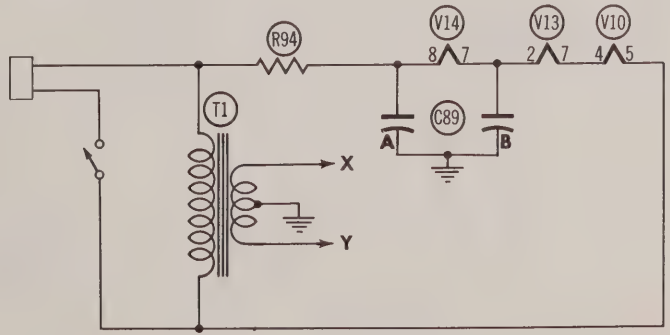
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, V6, V7 (V1 UHF only)**
No pic, no sound, has snow - **V2, V3, V4**
No pic, has sound, has raster - **V7, V16**
Has pic, no sound - **V8, V9, V10**

SYNC FAILURE
No vert. sync - **V8, V11**
No horiz. sync - **V8, V12**
No vert. or horiz. sync - **V7, V8**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16**
No vertical deflection - **V11**
Poor vert. linearity or foldover - **V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V15, M1, M2**
Vert. off freq. - **V8, V11**
Horiz. off freq. - **V8, V12**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative (See circuit below).



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from the chassis.
Do not remove the horizontal oscillator tube (V12) to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Remove the converter tube (V3) and replace with a 6U8 which has pin 1 removed. This will disable local oscillator and reduce the possibility of errroneous indications. An alternate method of disabling the local oscillator is to place a piece of transparent cellulose tape on the first two contacts (from front of drum assembly) of any channel and then switching the tuner to the insulated strip.
Connect a .001MFD capacitor across the vertical input of oscilloscope. Use only enough sweep generator output for usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	Not used	44.3MC (Unmod)	10	Use VTVM. DC probe to point (A). Common to chassis.	A1	Attenuate generator output for approximately 2 volts at VTVM. Adjust for maximum deflection.
2.	"	"	"	45.4MC	"	"	A2	"
3.	"	"	"	43.0MC	"	"	A3	"
4.	"	"	43.0MC (10MC Swp)	42.5MC 45.6MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Use only enough sweep generator output for usable pattern on scope. Check for response curve similar to Fig. 1. Markers should be at 40% on response curve. If necessary, retouch A1 thru A3 until desired response is obtained.
5.	"	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	Not used	41.25MC	"	Use VTVM. DC probe to point (A). Common to chassis.	A4	Adjust for MINIMUM deflection.
6.	"	"	43.0MC (10MC Swp)	42.5MC 45.6MC 41.25MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A5, A6	Adjust A5 and A6 for response curve similar to Fig. 2. If necessary, SLIGHTLY retouch A1, A2, A3 and A4 for desired response (Fig. 2).

SOUND IF ALIGNMENT

Tune in a TV station and adjust fine tuning control until sound bars just appear in the picture. Adjust A7 fully counter clockwise, then clockwise until the horizontal scanning lines are smooth and continuous. Readjust the fine tuning control for clearest picture and best sound.
Insert an attenuator in series with the antenna and the receiver antenna terminals so that the signal strength may be varied from weak to strong. If a suitable attenuator is not available stray feed the signal to the receiver by placing the antenna lead-in near the antenna terminals.
Reduce the signal input to the receiver so that the signal falls below the limiting level of the 6BN6 limiter-detector as evidenced by a "hiss" in the sound.
Adjust the secondary of the sound take-off transformer (A8), the sound IF transformer (A9), the quadrature coil (A10 and the buzz control (R7) for maximum sound and minimum buzz. If hiss disappears while adjusting increase attenuation until hiss reappears.

VHF OSCILLATOR ALIGNMENT

Remove dummy converter tube and replace the original 6U8 in its socket or remove the cellulose tape from tuner strip.
Connect the negative lead of a 1.5 volt bias supply to tuner AGC. Connect positive lead to chassis ground.
Complete oscillator alignment may not be necessary. If oscillator seems to be off frequency approximately the same amound for a majority of the channels it may be possible to correct them in one step using A11. It should be noted that this is an all channel oscillator adjustment and should not be used to correct any individual channel. If adjustment of A11 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment screw for each channel that is off frequency. The channel adjustment screws are reached thru a hole just below the channel switch shaft.
The correct adjustment screw is accessible thru the hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A12	Adjust to place sound marker in trap notch as in Fig. 3. Video marker should be at 50%. Use high scope gain and increase sweep generator output to view trap region.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A13	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A19	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A20	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A23	

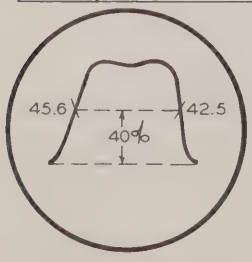


FIG. 1

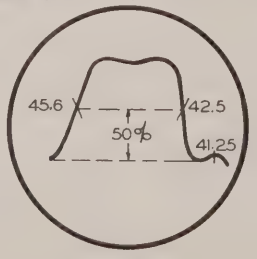


FIG. 2

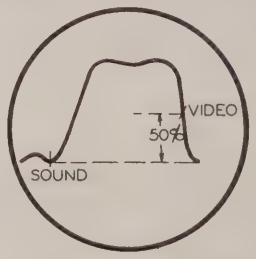


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

VHF RF AND MIXER ALIGNMENT

Leave bias connected as under "VHF Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A24, A25, A26	Adjust for response curve similar to Fig. 4 with markers above 90%.
9.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13			If markers fall below 70% on any channel make compromise adjustments of A24, A25 and A26 with channel switch set to that channel. Then check all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

UHF TUNER ALIGNMENT

Use only enough sweep generator output to provide usable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Adjustment of A28 (oscillator) and A29 (RF) is adjusted by bending tab in or out for correct adjustment.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across UHF antenna with 120Ω in each lead.	470MC (10MC Swp)	Not used	14	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A27	Adjust for curve of maximum amplitude and symmetry similar to Fig. 5.
11.	"	"	870MC (10MC Swp)	45.75MC IF marker	80	"	A28	Loosely couple 45.75MC marker to IF input plug. Adjust A28 (osc. tab) to place 45.75MC marker at 50% on response curve (Fig. 6).
12.	"	"	870MC (10MC Swp)	Not used	"	"	A29	Adjust A29 (RF tab) for maximum amplitude of response curve.

4.5MC TRAP ALIGNMENT

Tune in a local station and set fine tuning control to bring fine herringbone sound beat into the picture. Adjust A31 for minimum sound beat in the picture.

IF WAVE TRAP ADJUSTMENT

The IF wave trap should be tuned to minimize interference caused by signals which fall within the video IF bandpass (40-48MC).
Tune in a station on which the interference is noted and adjust A30 for minimum interference in the picture.

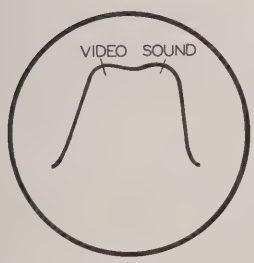


FIG. 4

FIG. 5

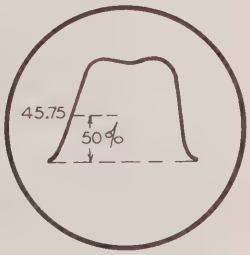
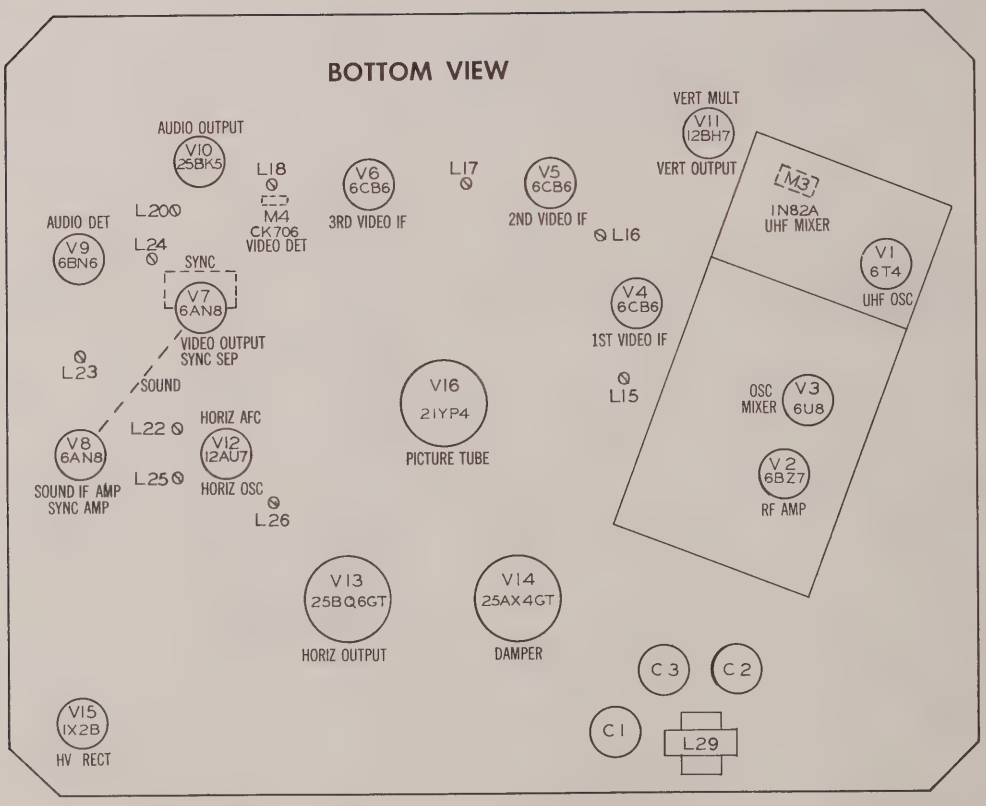


FIG. 6

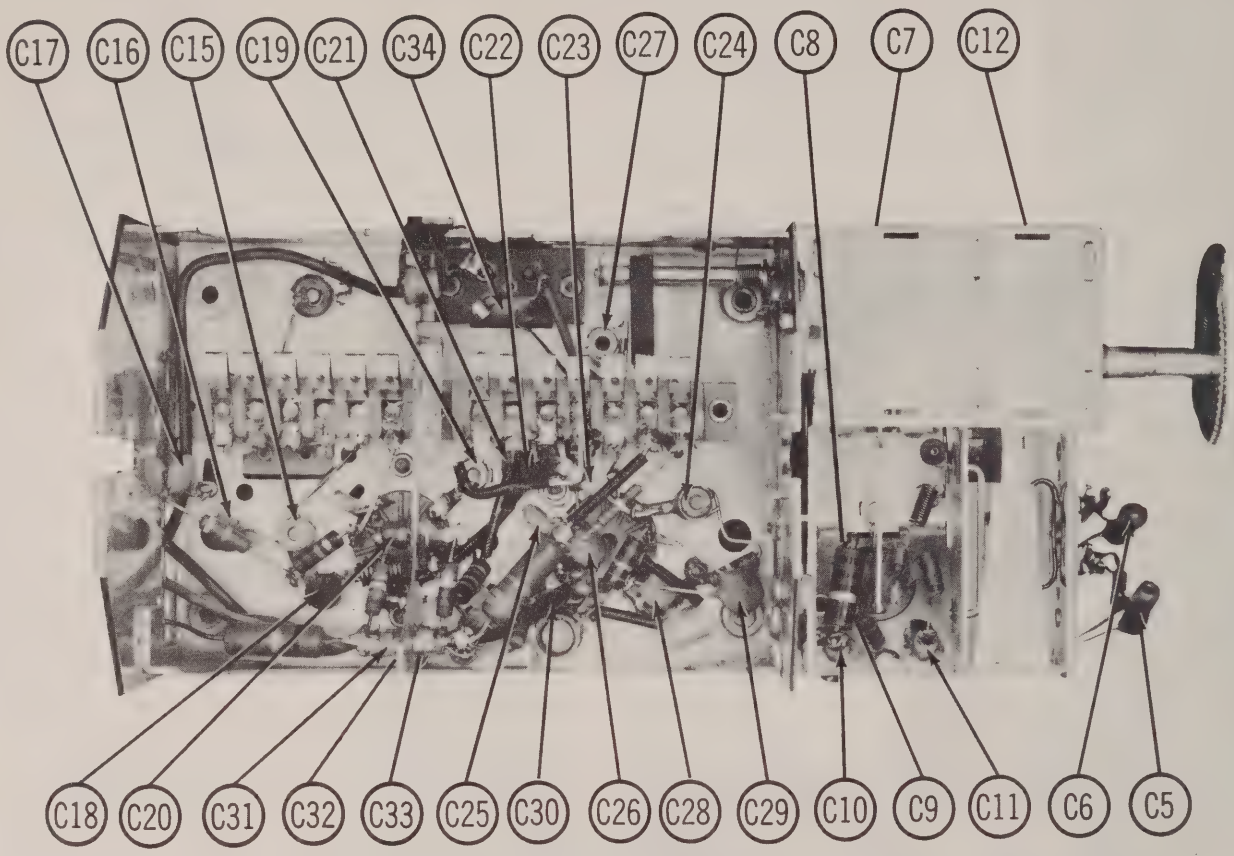
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6T4	*†8KΩ	8.2KΩ	0Ω	.1Ω	0Ω	8.2KΩ	*†8KΩ		
V 2	6BZ7	†1.7KΩ	130KΩ	INF	0Ω	.1Ω	INF	1Meg	0Ω	0Ω
V 3	6U8	†5.8KΩ	200KΩ	†100KΩ	.1Ω	0Ω	†9.2KΩ	0Ω	0Ω	10KΩ
V 4	6CB6	1Meg	47Ω	0Ω	.1Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 5	6CB6	1Meg	47Ω	0Ω	.1Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 6	6CB6	0Ω	150Ω	0Ω	.1Ω	†3.5KΩ	†3.5KΩ	0Ω		
V 7	6AN8	†130KΩ	2.2Meg	0Ω	0Ω	.1Ω	†5.6KΩ	†2.5KΩ	1Meg	250Ω
V 8	6AN8	†8.2KΩ	22KΩ	0Ω	0Ω	.1Ω	†33KΩ	†33KΩ	100KΩ	47Ω
V 9	6BN6	250Ω	.3Ω	0Ω	.1Ω	†18KΩ	4.8Ω	†220KΩ		
V 10	25BK5	†440Ω	NC	350KΩ	20KΩ	20KΩ	150Ω	350KΩ	†40Ω	TP
V 11	12BH7	▲4.2KΩ	2.2Meg	1.4KΩ	.1Ω	.1Ω	▲4Meg	47KΩ	120KΩ	1.7Ω
V 12	12AU7	†50KΩ	320KΩ	0Ω	0Ω	0Ω	†50KΩ	1.4Meg	300KΩ	.1Ω
V 13	25BQ6GT	NC	20KΩ	TP	†8.2KΩ	470KΩ	NC	20KΩ	0Ω	Top Cap ▲12Ω
V 14	25AX4GT	TP	NC	600KΩ	NC	†40Ω	NC	20KΩ	20KΩ	
V 15	1X2B		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			Top Cap ▲267Ω
V 16	21YP4	0Ω	22KΩ	Pin 6 †40Ω	Pin 10 †40Ω	Pin 11 †180KΩ	Pin 12 .1Ω			

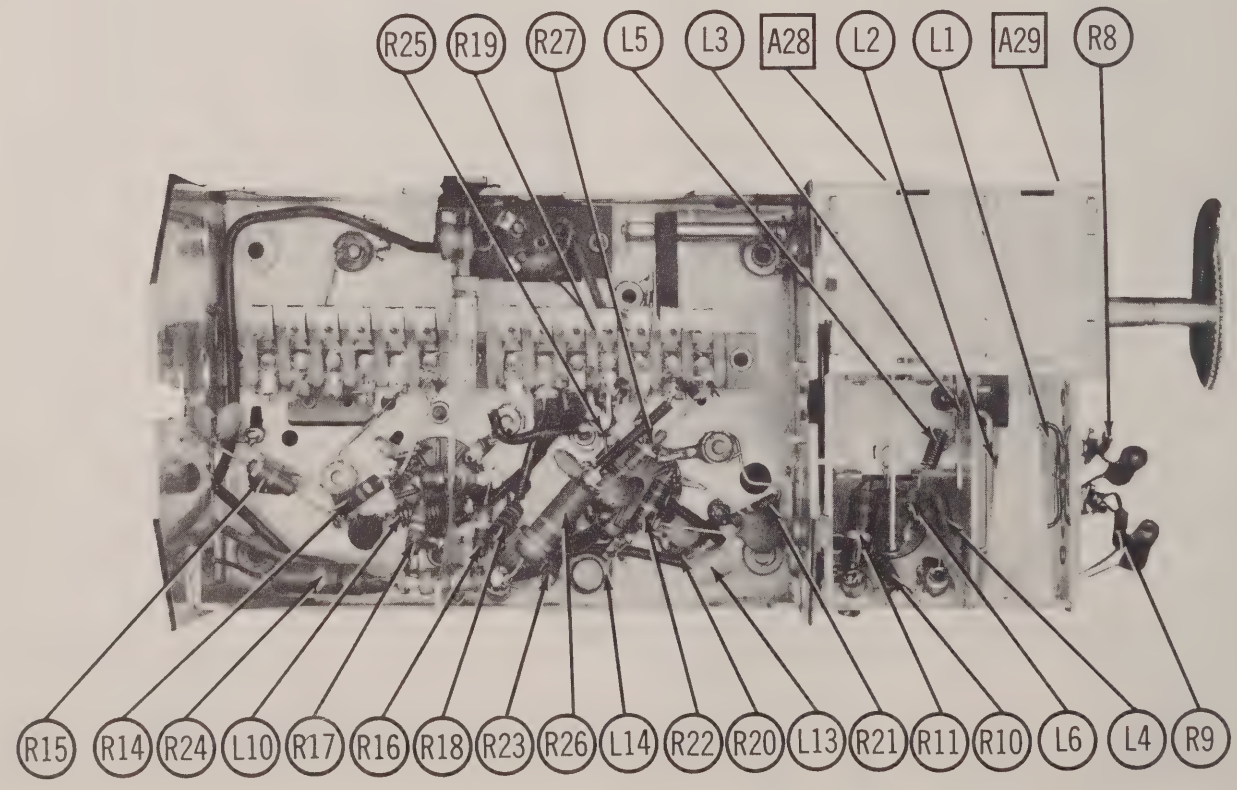
* MEASURED IN "UHF" POSITION.
† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V14.
NC - NO CONNECTION
TP - TIE POINT



TUBE PLACEMENT CHART

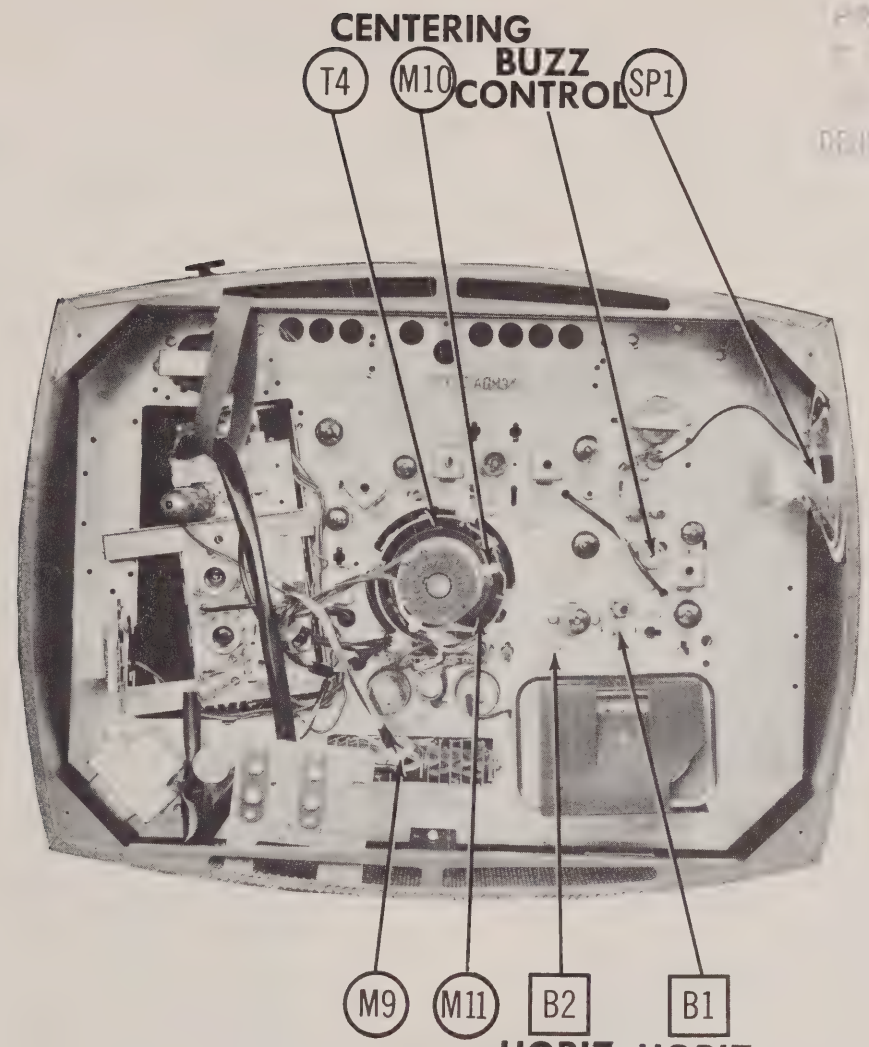


UHF-VHF TUNER BOTTOM VIEW CAPACITOR IDENTIFICATION



UHF-VHF TUNER BOTTOM VIEW RESISTOR, INDUCTOR & ALIGN. IDENT.

PROPERTY OF
[illegible]
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a station, preferably a test pattern.

Set the horizontal hold control to its mid-range position.

Connect a short jumper across the horizontal waveform slug (B2).

Starting with the horizontal frequency slug (B1) all the away out (counter clockwise), adjust B1 in a clockwise direction until the picture synchronizes.

Remove short from B2, connect the vertical input of an oscilloscope thru a 10KΩ resistor to the junction of L26, L27, R85 and C85. Connect low side to chassis ground.

Adjust the horizontal waveform slug (B2), until the broad and narrow peaks of the waveform on the scope are of equal height as shown in Fig. 7.

If necessary during alignment of B2 adjust B1 to keep the picture synchronized.

Remove scope from set. Picture should now remain in sync while switching off channel and back again.

If not, rotate the horizontal hold a few degrees.

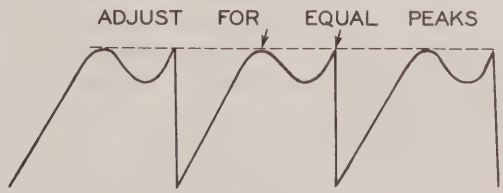


FIG. 7

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V13 and V14. Check M1 and M2. Check R94, R89, C87 and other associated components.

DRIVE LINES

Check by substitution V13 and V14. Check C86, C87, R89 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V13 and V14. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V12, V13 and V14. Check C81, C80, R76 for open. Check L25, L26, R80, R79, R2, C85, C77 and other associated components.

XMAS TREE EFFECT

Check by substitution V12, V13 and V14. Check T2 and T4 for internal arcing. Check C78, C79, R83, R82 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V11. Check waveform W6.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R69, C3C and other associated components.	Check R66, R5, R65, C73, C69, C70 and other associated components.

INSUFFICIENT SWEEP

Substitute V11. Check vertical size and vertical linearity controls for proper operation. Check R66, T3 and other associated components.

COMPRESSED AT BOTTOM

Substitute V11. Check C73, R66, R5, R65 and other associated components.

COMPRESSED AT TOP

Substitute V11. Check C3D, T6, T3, T4B and other associated components.

FOLDS

Substitute V11. Check C71, C72, C73, R67, T3 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V7 and V8. Check C66, C67, R57, R60, R62, R61 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V11. Check vertical integrator network. Check C69, R65, R4 and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Substitute V12. Check C77, C85, C81, C80, R2, R80, R85, R79 and other associated components.

HORIZONTAL BENDING

Check by substitution V7, V8 and V12. Check components associated with V12.

VIDEO

LOSS OF VIDEO

Substitute V7. Check C49, C53, C54, R44 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A31. Check video IF alignment.

POOR CONTRAST

Substitute V7. Check R42, R43, L21, L18, C49, C53 and other associated components.

NEGATIVE PICTURE

Substitute V7. Check picture tube. Check C49, C53, L21 and other associated components.

SMEAR

Substitute V7. Check video crystal detector network. Check L18, L19, L21, C49, C53, C54 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V2, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9 and V10. Check stage V10 using audio signal generator. Apply audio signal across R18.

If Satisfactory	If Unsatisfactory
Check audio detector and audio IF stages for component failure or change of value.	Check C63, C65, R53, R49, R50, R51, T5, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A10 and R7 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

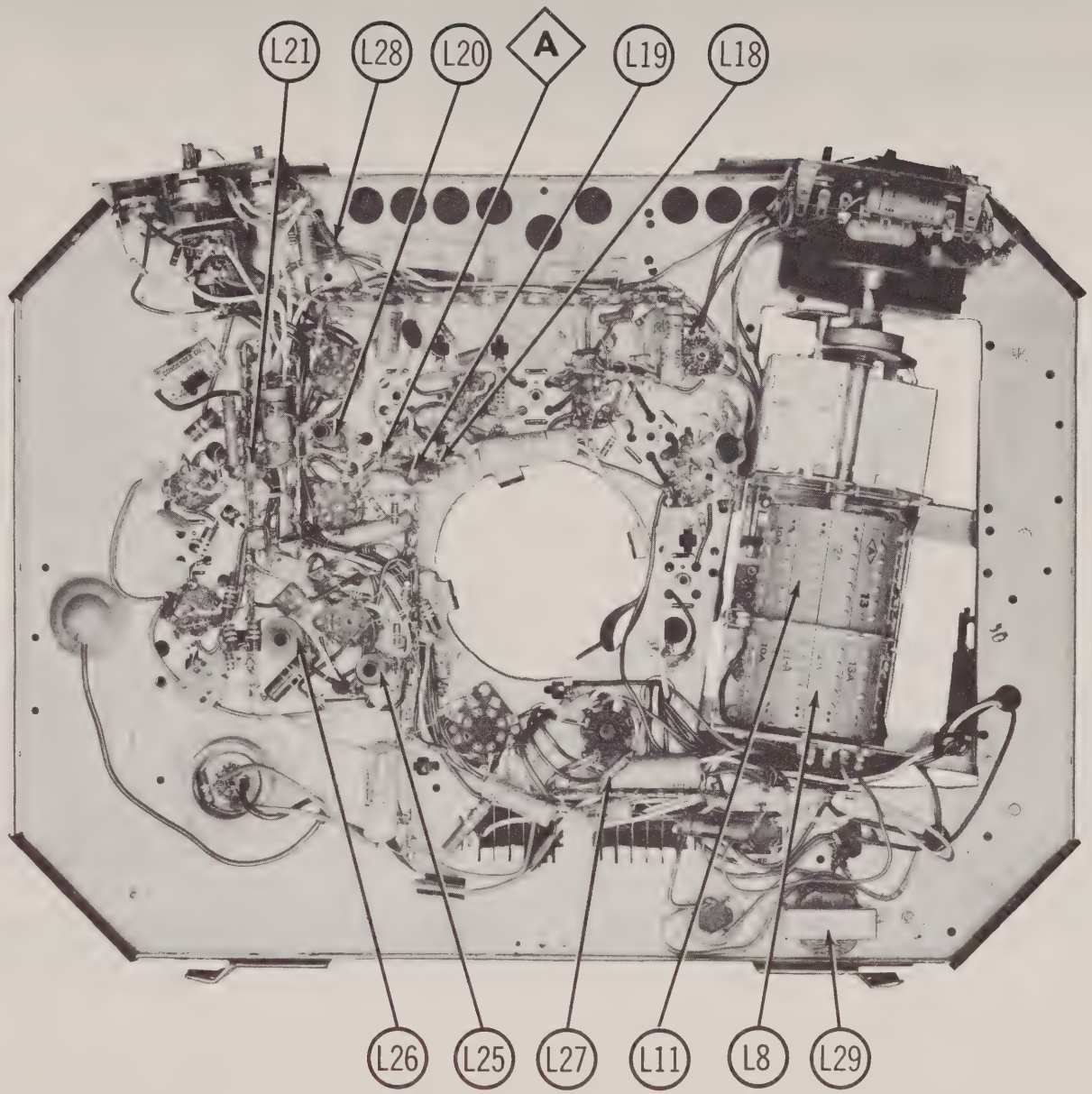
POWER

DEAD SET

If filaments fail to light, except V10, V13 and V14, check T1. If V10, V13 and V14 fail to light, check filament continuity and R94, since these tubes are connected in series. Check AC interlock assembly and switch on volume control. If filaments light, check M1 and M2. Check R93. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Check M1, M2 and R93. Check B+ filter and decoupling network.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PROPERTY OF
DENVER, COLORADO

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	UHF Osc.	6T4	6T4	7DK	
V2	RF Amp.	6BS7	6BS7	9AJ	
V3	Mixer-Osc.	6U8	6U8	9AE	
V4	1st Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Output-Sync Sep.	6AN8	6AN8	9DA	
V8	Sound IF Amp. - Sync Amp.	6AN8	6AN8	9DA	
V9	Audio Det.	6BN8	6BN8	7DF	
V10	Audio Output	6BM8	6BM8	9DQ	
V11	Vert. Mult. - Vert. Output	12BH7	12BH7	9A	
V12	Horiz. AFC - Horiz. Osc.	12AU7	12AU7	9A	
V13	Horiz. Output	25BQ6GT	25BQ6GT	8AM	
V14	Damper	25AX4GT	25AX4GT	4CG	
V15	HV Rectifier	1X2B	1X2B	1Y	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: TRUETONE PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V16	21YP4A ‡ 21YP4	21YP4A ‡ 21YP4	21YP4A ‡ 21YP4	21YP4A ‡ 21YP4	21YP4A ① 21YP4	12L 12L	① Aluminized ② Silver Screen

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: TRUETONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	NOTES
C1	150	150	8C-22464			FP1J7	TM-150-150	T-050	
C2	150	150	8C-22463			FP1J7	TM-150-150	T-050	
C3A	±100	300	8C-23089				TM-4128	T-030	
B	±10	300						T-030	
C	±25	450						MT-0580	
D	50	50							
C4	5	200	8C-24174			TC69	TD-B-350	FM-4504	
C5	1000	1000	8G-23656	DD30-102	1R5KV-103	DC-3021		C-1310	
C6	1000	1500	8G-23656	DD30-102	1R5KV-103	DC-3021		C-1310	
C7	3-5.5			SZS-6					
C8	805								
C9	800								
C10	1000		33-12377-1						
C11	1000		33-12377-1						
C12	33			TCN-33	N750K-330				
C13	1000	1500	8G-23656	DD30-102	1R5KV-103	DC-3021		C-1310	
C14	1000	1500	8G-23656	DD30-102	1R5KV-102	DC-3021		C-1310	
C15	4-8.5		32-2000046-8						
C16	6.8		32-2000044-4	CZ5-6S8	NP0A-6S8		ZT-5668		
C17	1000		32-2000044-2	DD-103	801-001	DC-531			
C18	3.8		32-2000044-5						
C19	4-8.5		32-2000010-14						
C20	300		32-2000020-1						
C21	47		32-2000044-1	DD-470	831-470		UC-5447		
C22	1.5		32-2000044-8	TCZ-1R5	NP0A-1R5		ZT-5515		
C23	47		33-2000018-1	MT7-500					
C24	6.3-.5		32-2000010-7						
C25	10		32-2000044-7						
C26	7.5		32-2000044-6						
C27	1-6		32-2000010-11	SZS-4	31S-01-10				
C28	1000		32-2000044-3	DD-102	801-001	DC-521			
C29	220		32-2000044-9	DD-221	81S-221	UC-5323			
C30	68		32-2000044-11	TCN-68	N750L-680	NT-5468			
C31	1000		32-12377-1						
C32	1000		32-12377-1						
C33	1000		32-12377-1						
C34	500		32-2000044-2	DD-501	831-501	DC-521			
C35	1000		8G-13201	DD-102	801-001	DC-521		K-1310	
C36	5000		8G-13202	DD-502	811-005	DC-535		C-1350	
C37	680		8G-13205	D6-681	GP2K-681	UC-5368		K-1368	
C38	1000		8G-13201	DD-102	801-001	DC-521		K-1210	
C39	10		8G-19502	TCN-10	N750K-100	NT-541		KR-1410	
C40	1000		8G-13201	DD-102	801-001	DC-521		K-1210	
C41	680		8G-21205	D6-681	GP2K-681	UC-5368		K-1368	
C42	1000		8G-13201	DD-521	801-001	DC-521		K-1210	
C43	5000		8G-13202	DD-502	811-005	DC-535		C-1350	
C44	10		8G-19502	TCN-10	N750K-100	NT-541		KR-1410	
C45	1000		8G-20754	D6-102	GP2L-102	UC-521		K-1210	
C46	1000		8G-20754	D6-102	GP2L-103	UC-521		K-1310	
C47	1000		8G-13201	DD-102	801-001	DC-521		K-1210	
C48	.22	300	8K-23086	DF-104		PT401	IMP2-P23	3302302	
C49	.1	300	8K-23084	DF-104		PT401	IMP2-P1	330201	
C50	10		8G-11724	D6-101	GP1K-101	UC-531		K-1310	
C51	51		33-13788						
C52	3.3		8L-23551	TCZ-3S3	NP0A-3S3		ZT-5533		
C53	.1	400	8K-23095	DF-104		PT401	IMP4-P1	330401	
C54	100	500		TCZ-100	NP0-337-100	MC3S35		KR-1310	Note 1
C55	33		8G-19503	TCZ-33	NP0K-330		ZT-5433		
C56	30		14B-23772						Note 2
C57	10000		8G-20389	DD-103	81L-01	DC-541			
C58	470	500	8F3-121	D6-471	81L-471	MC3S45		KR-1347	
C59	10000		8G-20389	DD-103	81L-01	DC-541			
C60	10000		8G-20389	DD-103	81L-01	DC-541			
C61	10		8G-11719	TCZ-10	NP0K-100	ZT-531		KR-1410	
C62	1000		8G-13201	DD-102	801-001	DC-521		K-1310	
C63	.01	600	8K-23081	D6-103	GP2-333-103	PT401	IMP4-B1	330411	
C64	.01	600	8K-23081	D6-103	GP2-333-103	PT401	IMP4-B1	330411	
C65	.01	600	8K-23103	D6-103	GP2-333-103	PT401	IMP6-B1	330611	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: TRUETONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	NOTES
C65A	270							K-1327	
B	10000		†17A-24313	D6-271	GP2K-271	UC-5327		330411	
C	25			DD-103	811-01	DC-511		330611	
C67	.047	300	8K-23085	DD-350	GP1K-350	DC-5425		C-1425	
C68A	3000			DF-503		PT4167	IMP3-S47	3303147	
B	5000		±17A-23376	±PC-100	±6405-01	PT4235	IMP3-D3	C-1250	
C	5000					PT425	IMP6-D5	C-1250	
C68	2000		8G-19532	D6-302	GP2-333-202	UC-532		C-1320	
C70	.1	300	8K-23094	DF-104		PT401	IMP2-P1	330201	
C71	.022	400	8K-23515	DF-303		PT4123	IMP6-S3	3306123	
C72	.1	300	8K-23094	DF-104		PT401	IMP2-P1	330201	
C73	.1	400	8K-23095	DF-104		PT401	IMP4-P1	330401	
C74	1000	3500	8G-23701	DD30-102	3KV-102	DC-3021		C-3210	
C75	.022	600	8K-23104	DF-303	61T-02	PT6122	IMP6-S23	3306122	
C76	.022	400	8K-23083	DF-303	61T-02	PT4122	IMP4-S23	3304123	
C77	68	500	8F3-113 -	TCZ-68	NP0-337-680			KR-1468	
C78	82	500	8F3-112	TCZ-82	NP0-337-820			KR-1482	
C79	82	500	8F3-112	TCZ-82	NP0-337-820			KR-1482	
C80	.022	300	8K-23082	DF-303	61T-02	PT4123	IMP4-S23	3304123	
C81	.047	300	8K-23083	DF-503		PT4147	IMP3-S47	3303147	
C82	.47	300	8K-23087			PT4147	IMP3-P47	3303447	
C83	.047	400	8K-23094	DF-503		PT4147	IMP4-S47	3304147	
C84	270	500	8F3-235	TCZ-270	NP0-335-271			KR-1337	
C85	.01	900	8M-24439						
C86	1000	500	8F6-125			MC3S55		KR-1210	
C87	.001	600	8K-23099	D6-102	GP3L-102	PT631	IMP6-D1	330631	
C88	.047	400	8K-23094	DF-503		PT4147	IMP4-S47	3304147	
C88A	5000		8G-19790	DD3-502	811-005	DC-535		C-1250	
B	5000				811-005	DC-535		C-1250	
C90	.1	600	8K-23106	DF-104		PT601	IMP6-P1	330601	
C91	.18	300	8K-23085			PT4215	IMP4-P18	3304015	
C92	220	3000	8G-23953	DD30-221	3KV-221			K-3322	
C93	47	3000	8G-24025	DD30-470	3KV-470			K-4447	
C94	47	3000	8G-23645	DD30-470	3KV-470	MC1447		K-4447	
C95	5000		8G-13962	DD-502	811-005	DC-525		C-1250	

Note 1. Not used in some versions.
Note 2. Sound IF coupling shielded lead.
† Items C68A, C68B, C69C, R36A, R36B are combined in one unit.
* Items C68A, C68B, C69C, R63A, R63B and R63C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	B10A-23714	*QJ-734	RTY-686	F1-4	UF13L	Contrast - Panel
B	Shaft	½			B3-S3	PA-S3	UM6A ‡	Volume - Rear
C	Switch				KB-1	UB-36		Attach to R1B
R2A	50KΩ	½	B10B-23694	Q1L-129	A47-50K-S	AB-31	U-35	Horiz. Hold
B	Shaft	½	Not Reg.	Not Reg.	KBS-3	AK-4	Not Reg.	Attach to R2A
R3A	500KΩ	½	B10B-23695	Q1L-133	A47-500K-S	AB-39	U-50	Brightness
B	Shaft	½	Not Reg.	Not Reg.	KBS-3	AK-4	Not Reg.	Attach to R3A
R4A	100KΩ	½	B10G-23693	Q1L-126	A47-100K-S	AB-40	U-41	Vert. Hold
B	Shaft	½	Not Reg.	Not Reg.	KBS-3	AK-4	Not Reg.	Attach to R4A
R5A	2MEG	½	B10B-23698	Q1L-140	A47-2Meg-S	AB-34	SU-59	Vert. Size
B	Shaft	½	Not Reg.	RQ	FKS-1/4	AK-1	Not Reg.	Attach to R5A
R6A	6000Ω	½	B10B-23407	Q1L-114	A47-5000-S	AB-10	SU-14	Vert. Linearity - Note
B	with 1000Ω stop	½						
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7	750Ω	1	A10D-23257		39-750			Buzz (Wire wound)

* CONCENTRIKIT EQUIVALENT: KIT K-8, BASE ELEMENTS & SHAFTS: B17-N8 & P17-102 (PANEL)
B13-137 & B2-115 (REAR)
76-1 SWITCH

† Universal replacement (Mallory exact duplicate part no. UE65G)
Note: Connect a 10000 resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	NOTES
R2	22KΩ	½	9B1-90	BTS-220K	
R3	220KΩ	½	9B1-90	BTS-220K	
R4	220KΩ	½	9B1-73	BTS-2200	
R11	220Ω	1	9B2-86	BTA-2200	
R12	220KΩ	½	9B1-27	BTS-220K	
R13	220KΩ	½	9B1-27	BTS-220K	
R14	22KΩ	½	9B1-78	BTS-22K	
R15	47KΩ	½	9B1-23	BTS-47K	
R16	270KΩ	½	9B1-91	BTS-270K	
R17	180KΩ	½	9B1-89	BTS-180K	
R18	680Ω	½	9B1-50	BTS-680	
R19	15KΩ	½	9B1-76	BTS-15K	
R20	100KΩ	½	9B1-25	BTS-100K	
R21	100KΩ	½	9B1-25	BTS-100K	
R22	10KΩ	½	9B1-86	BTS-100K	
R23	820KΩ	½	9B1-73	BTS-8200	
R24	1000Ω	½	9B2-62	BTA-1000	
R25	10KΩ	½	9B1-74	BTS-10K	
R26	330Ω	10	9B3-09	BTA-3300	
R27	150KΩ	½	9B1-26	BTS-150K	
R28	470KΩ	½	9B1-70	BTS-4700	
R29	1000Ω	½	9B1-52	BTS-1000	
R30	47Ω	½	9B1-46	BTS-47	
R31	1000Ω	½	9B1-52	BTS-1000	
R32	47KΩ	½	9B1-82	BTS-47K	
R33	1000Ω	½	9B1-52	BTS-1000	
R34	47Ω	½	9B1-46	BTS-47	
R35	1000Ω	½	9B1-52	BTS-1000	
R36	47KΩ	½	9B1-82	BTS-47K	
R37	150Ω	½	9B1-52	BTS-150	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	NOTES
R38	1000Ω	½	9B1-52	BTS-1000	
R39	1MEG	½	9B1-98	BTS-1MEG	
R40	4700Ω	½	9B1-70	BTS-4700	
R41	1MEG	½	9B1-98	BTS-1MEG	
R42	47Ω	½	9B1-46	BTS-47	
R43	3900Ω	½	9B1-69	BTS-3900	
R44	5600Ω	2	9B4-71	BTB-5600	
R45	100KΩ	½	9B1-86	BTS-100K	
R46	100KΩ	½	9B1-86	BTS-100K	
R47	47Ω	½	9B1-46	BTS-47	
R48	33KΩ	½	9B2-80	BTA-33K	
R49	18KΩ	2	9B4-77	BTB-18K	
R50	680Ω	½	9B1-50	BTS-680	
R51	220KΩ	½	9B1-90	BTS-220K	
R52	330KΩ	½	9B1-92	BTS-330K	
R53	150Ω	½	9B2-52	BTA-150	
R54	470KΩ	½	9B1-29	BTS-470K	
R55	10KΩ	½	9B1-74	BTS-10K	
R56A	33KΩ	½	9B3-09	BTA-3300	
B	2.2MEG		†17A-24813	BTS-2.2Meg	
R57	560KΩ	½	9B1-95	BTS-560K	
R58	100KΩ	½	9B1-86	BTS-100K	
R59	22KΩ	½	9B1-78	BTS-22K	
R60	1MEG	½	9B1-98	BTS-1MEG	
R61	4700Ω	½	9B2-70	BTA-4700	
R62	1000Ω	½	9B1-52	BTS-1000	
R63A	22KΩ	½		BTS-22K	
B	8200Ω		*17A-23376	BTS-8200	
C	8200Ω			BTS-8200	
R64	47KΩ	½	9B1-83	BTS-47K	

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	NOTES
R65	82KΩ	½	9B1-85	BTS-83K	
R66	3.3MEG	½	9B1-104	BTS-3.3Meg	
R67	4700Ω	½	9B1-70	BTS-4700	
R68	2.2MEG	½	9B1-102	BTS-2.2Meg	
R69	3300Ω	5	9C12-1105	PW7-3300	
R70	100KΩ	½	9B1-86	BTS-100K	
R71	22KΩ	½	9B1-78	BTS-22K	
R72	560Ω	½	9B1-59	BTS-560	
R73	560Ω	½	9B1-59	BTS-560	
R74	330KΩ	½	9B1-92	BTS-330K	
R75	820KΩ	½	9B1-97	BTS-820K	
R76	68KΩ	½	9B2-84	BTA-68K	
R77	220KΩ	½	9B1-90	BTS-220K	
R78	3300Ω	½	9B1-69	BTS-3300	
R79	18KΩ	½	9B1-77	BTS-18K	
R80	39KΩ	½	9B1-81	BTS-39K	

Note: Not used in some versions.
† Items R56A, R56B, C68A, C68B and C68C are combined in one unit.
* Items R63A, R63B, R63C, C68A, C68B and C68C are combined in one unit.

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	NOTES
R81	4700Ω	½	9B1-17	BTS-4700	
R82	68KΩ	1	9B2-84	BTA-68K	
R83	82KΩ	½	9B1-85	BTS-82K	
R84	100KΩ	½	9B1-86	BTS-100K	
R85	68KΩ	½	9B1-84	BTS-68K	
R86	47KΩ	½	9B2-82	BTA-47K	
R87	470KΩ	½	9B1-94	BTS-470K	
R88	120Ω	½		BTS-120	
R89	8200Ω	2	9B4-73	BTB-8200	
R90	1.5Ω	1	9C1-1065		
R91	2700Ω	3	9C1-1104		
R92	250Ω	5	9C-24033	PW7-2500	
R93	9Ω		6DM-23018		
R94	125Ω	15	9C-23873		
R95	220KΩ	½	9B1-37		Note

TRANSFORMER (FILAMENT)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA: TRUETONE PART No.	Hallderson PART No.	Merit PART No	RCA TYPE No	Stancor PART No	Thordarson PART No	Triad PART No
T1	117VAC	① 6.3VCT ② .33A	② 2.35A	12D-23699		P-2959			21F67	

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No	Hallderson PART No.	Merit PART No	RCA PART No	Stancor TYPE No	Thordarson PART No	Triad PART No
T2	Horiz. Output Trans.	12E-23959					FLY-80	
T3	Vert. Output Trans.	12E-23726	Z1804	A-3037	222T1	V313	A-8123	A-102X
T4A	Yoke-Horiz. (8MIL)	20L-23744 ‡	DF80R ②③	MDF-70 ②③	206D1 ‡ ③	T70F10/43 ②③	DY-8A ②③	Y-5 ② ③
B	Vert. (42MH)							Y-12 ② ③

① Deflection yoke assembly. Includes deflection yoke, Truetone part #13M-23755; yoke positioning screw, Truetone part #3216-12186 and resistors R72 & R73.
② Use original rear cover and centering device.
③ Use original horizontal damping network.
④ Use original yoke damping network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI	SEC	REPLACEMENT DATA: TRUETONE PART No	Hallderson PART No.	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T5	7KΩ	4.7Ω	12C-23704	Z1113	A-3986	A-3078	26S48	S-7X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: TRUETONE PART No.	QUAM PART No.	NOTES
SP1	5"	PM	3.7Ω	18A-21816	5A07	

COILS (RF-IF)

ITEM No.	USE	DC RES: PRI.	SEC.	REPLACEMENT DATA: TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	UHF Ant. Coil	0Ω						Tapped
L2	UHF RF Choke	0Ω						
L3	UHF Osc. Coupling Coil	0Ω						
L4	FIL. Choke	0Ω		83-64245				
L5	FIL. Choke	0Ω		83-64245				
L6	Cathode Choke	0Ω		83-64246				
L7	UHF IF Output	0ΩCT		83-64661				
L8A	VHF Ant. Coil	0Ω	CT 0Ω	83-64152				Channel 2
B	VHF Ant. Coil	0Ω	CT 0Ω	83-64153				Channel 3
C	VHF Ant. Coil	0Ω	CT 0Ω	83-64154				Channel 4
D	VHF Ant. Coil	0Ω	CT 0Ω	83-64155				Channel 5
E	VHF Ant. Coil	0Ω	CT 0Ω	83-64156				Channel 6
F	VHF Ant. Coil	0Ω	CT 0Ω	83-64157				Channel 7
G	VHF Ant. Coil	0Ω	CT 0Ω	83-64158				Channel 8
H	VHF Ant. Coil	0Ω	CT 0Ω	83-64159				Channel 9
I	VHF Ant. Coil	0Ω	CT 0Ω	83-64160				Channel 10
J	VHF Ant. Coil	0Ω	CT 0Ω	83-64161				Channel 11
K	VHF Ant. Coil	0Ω	CT 0Ω	83-64162				Channel 12
L	VHF Ant. Coil	0Ω	CT 0Ω	83-64163				Channel 13
L8	UHF LP Coil			82A-64663				
L10	Neut. Coil	0Ω		39-13676-2				
L11A	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64172				Channel 2
B	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64173				Channel 3
C	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64174				Channel 4
D	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64175				Channel 5
E	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64176				Channel 6

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
F	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64177				Channel 7
G	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64178				Channel 8
H	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64179				Channel 9
I	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64180				Channel 10
J	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64181				Channel 11
K	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64182				Channel 12
L	VHF RF Mixer Grid & Osc. Coils	0Ω		83-64183				Channel 13
L12	UHF IF Coils	0Ω	0Ω	83A-64662				Includes 5.6KΩ resistor
L13	Fil. Choke	0Ω		39-12676-1				
L14	Conv. Plate	.1Ω		83A64915				
L15	1st. Video IF			13A-24203	17-4509 *	TV-127 ■		Includes 41.25MC trap
L16	2nd. Video IF	0Ω	0Ω	13A-24224	17-5004 ▲	TV-125 ▲	6232 ▲	
L17	3rd. Video IF	0Ω	0Ω	13A-24224	17-5004 ▲	TV-125 ▲	6232 ▲	
L18	Series Peaking Coil	1.6Ω		16A-22427	19-1004		4610	7.5 Microhenries
L19	Shunt Peaking Coil	7.5Ω		16A-19365	19-4400		6174	410 Microhenries
L20A	4.5MC Trap	1.8Ω						
B	Sound IF	2.8Ω		201-23729				Includes C51, C52, C55, and C56.
L21	Shunt Peaking Coil	13.5Ω		16A-24375			4651	770 Microhenries
L22	Sound Trap	1.4Ω		16A-24505	20-1004 ♦	TV-151 ♦	1469 ♦	
L23	2nd. Sound IF	.3Ω	.3Ω	201-23873	17-3495 ▲	TV-113 ▲	6203 ▲	
L24	Quadrature Coil	4.8Ω		201-23727	20-1005	TV-151	1480	
L25	Horiz. Osc.	22Ω	55Ω	12E-24440	19-1576	TV-163	6210	
L26	Horiz. Phase	35Ω		13M-24441	20-1029	MWC-1	6314	
L27	RF Choke	1.5Ω		16A-21701	19-1005		4612	8 Microhenries
L28	Isolation Coil	1.5Ω			19-1005		4612	8 Microhenries

* Drill mounting holes and add capacitor externally.
■ Cut out chassis hole and use adaptor plate and add capacitor externally.
▲ Cut out chassis hole and use adaptor plate.
♦ Drill mounting hole.

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L29	.238ADC	39.5Ω	.64HY	16A-23889	C5041	C-2996 ①	A-2328 ①	26C44 ①	C-23X ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: TRUETONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.265ADC	21J-23840	1236A	MR-300	6S300	6Q4	250A	
M2	.265ADC	21J-23840	1236A	MR-300	6S300	6Q4	250A	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: TRUETONE PART No.	SYLVANIA PART No.		NOTES
M3	1N82A	63-64876	1N82 or 1N82A		UHF Mixer
M4	CK706		1N60 or 1N132		Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M5	Tuner	D21I-24245	VHF
M6	Tuner		UHF
M7	Trap	83A64917-3	VHF Ant. Input Filter
M8	Video Det. Assy.	13B-24206	Includes M4, Coils and Capacitors
M9	Switch		Fringe - Local (DPDT - Slide type)
M10	Centering Device	16M-23770	
M11	Ion Trap	16M-19706	
	Cabinet	200-24288-1	
	Knob	5B-24276-A29	UHF Channel Indicator
	Knob	5B-24282-A93	VHF Selector
	Knob	5B-24283-A93	UHF Channel Selector - VHF Fine tuning
	Knob	5B-24787-A93	Contrast
	Knob	5B-23786-A93	On-off-volume
	Knob	5B-23805-A93	Brightness, Vert. Hold and Vert. Linearity

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V12, V13, V14 and V15. Check waveform W11.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C90, C91, C92, C88, R89 and other associated components.	Check L25, L26, C83, C84, C85, C87, C86, R86, R80, R81, R79 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V13 and V14. Check M1 and M2. Check R93, R89, C87 and other associated components.

BLOOMING

Check by substitution V13, V14 and V15. Check M1 and M2. Check R93, R89, C87, T2, T4A and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V2, V3, V4, V5, V6 and V7. Check video IF components for failure or change of value. Raster, No Sound, No Picture UHF, substitute V1.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet just below the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

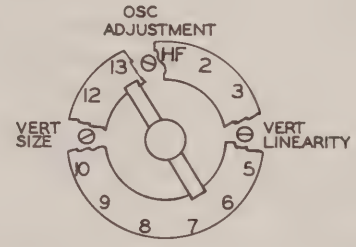
For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instruction).

SERVICE ADJUSTMENT LOCATION

Also see tube placement chart on page 5.



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

To adjust the horizontal oscillator circuit remove the rear cover and supply power to the set. Set the horizontal hold control at the mid-range position of its range and adjust the horizontal frequency slug (L26) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

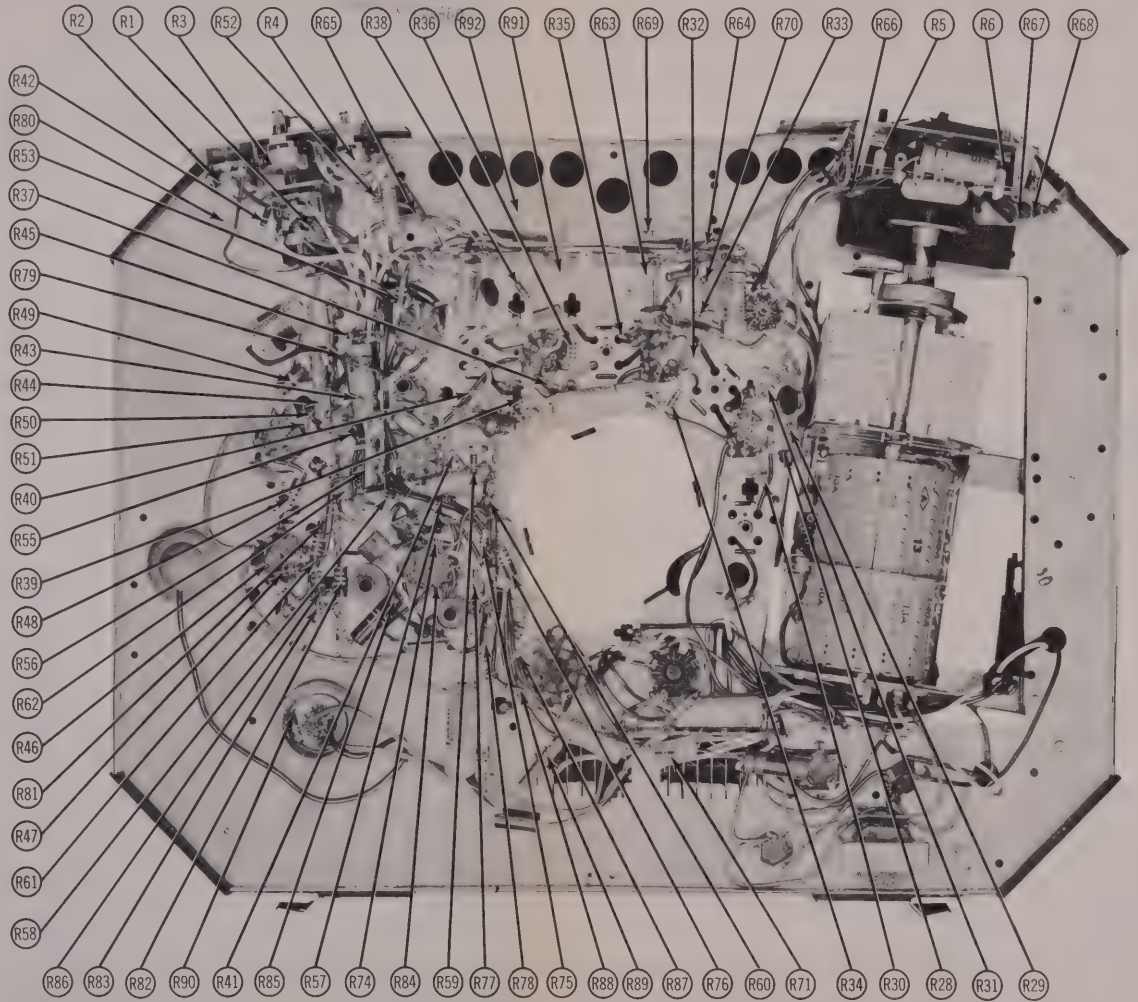
To eliminate sound IF detector buzz, adjut the buzz control (R7) located on top of the chassis for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 7 push-on type control knobs from top of cabinet.
2. Remove 5 metal screws from under side of cabinet.
3. Remove 4 metal screws. Remove rear cover.
4. Disconnect speaker leads.
5. Remove 6 metal screws located on the sides and top of safety glass frame.
   Remove 2 metal screws located under top control knobs.
6. Slide picture tube and chassis from front of cabinet.
7. Remove 2 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

ZENITH MODELS R519R, W, R521F, G, R, W, Y, T522F, G, R, V, W, T524R, V, W (Ch. 5L07, 5R03, 5R07)

ZENITH MODELS R519R, W, R521F, G, R, W, Y, T522F, G, R, V, W, T524R, V, W (Ch. 5L07, 5R03, 5R07)

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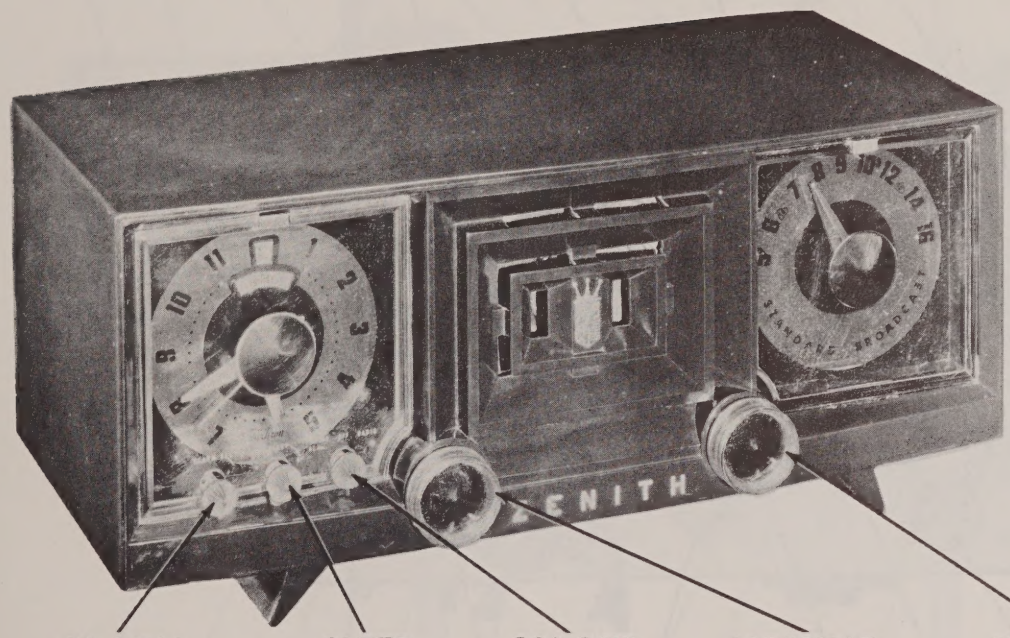

ZENITH MODELS R519R, W, R521F, G, R, W, Y, T522F, G, R, V, W, T524R, V, W (Ch. 5L07, 5R03, 5R07)

TRADE NAME	Zenith Models R519R, W (CH. 5R07), R521G, R, W, Y (CH. 5R03), T522F, G, R, V, W (CH. 5R07), T524R, V, W (CH. 5L07)
MANUFACTURER	Zenith Radio Corp., 6001, Dickens Ave., Chicago, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.5MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod.)	600KC	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	1400KC	"	A6	"

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ZENITH PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det. -AVC-AF Amp.	12AT6	12AT6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	ZENITH PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	80	150	22-2351			FP216	TM-8040-150	D-085	
B	40	150							
C2	.05	200	22-829	DF-503		PT415	IMP4-S5	330415	
C3	250		22-1666	D6-251	GP2K-251	UC-5325		K-1325	
C4	.05	200	22-829	DF-503		PT415	IMP4-S5	330415	Note 1.
C5	10000		22-3	DD-103	811-01	DC511	IMP6-S1	330411	
C6	470		22-6	DD-471	811-471	UC-5347		K-1347	
C7	10000		22-3	DD-103	811-01	DC511	IMP4-S1	330411	
C8	.01	200	22-1182	D6-103	GP3-333-103	PT411	IMP4-S1	330411	
C9	10000		22-3	DD-103	811-01	DC511	IMP4-S1	330411	
C10	.05	200	22-829	DF-503		PT415	IMP4-S5	330415	

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	63-2826	Q11-133	A47-500K-Z	AB-617	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
R2	3Ω	2	63-3219	W-5				Dimmer See Note 1.

Note 1. Used in chassis 5R03 only.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R3	22KΩ	½	63-1842	BTS-22K	
R4	68Ω	½	63-1737	BTS-68	
R5	47KΩ	½		BTS-47K	Note 1.
R6	2.2Meg	½	63-1926	BTS-2.2Meg	
R7	4.7Meg	½	63-1940	BTS-4.7Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R8	470KΩ	½	63-1898	BTS-470K	
R9	470KΩ	½	63-1898	BTS-470K	
R10	150Ω	½	63-1750	BTS-150	
R11	1000Ω	1	63-965	BTA-1000	
R12	22Ω	1	63-3197		

Note 1. Not used in some versions.

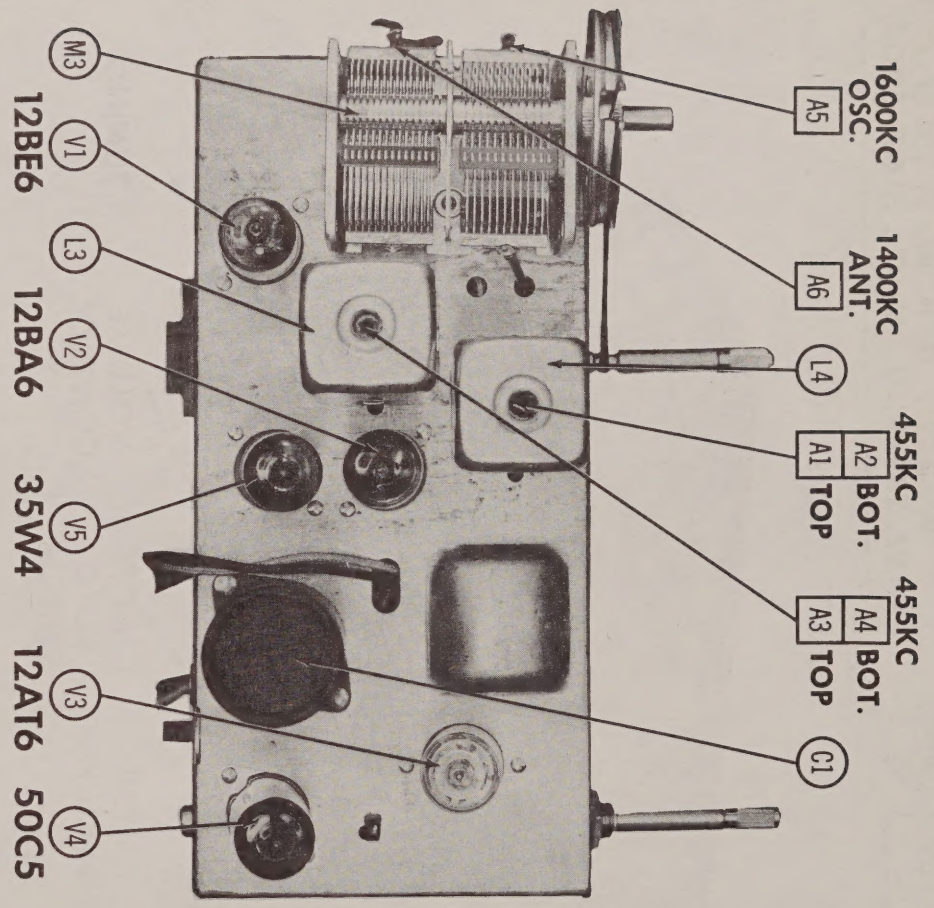
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.34KΩ	3.3Ω	95-1354	Z1102①	A-3031①	A-3330①	24S50A①	S-16X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	49-713	4A07	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

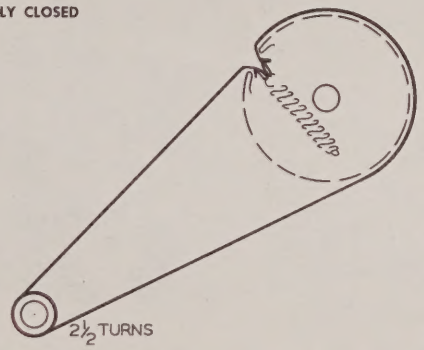
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Antenna	3.2Ω		S-22556*				Includes cabinet back.
L2	Osc. Coil	.6Ω	6Ω	S-22709■	14-1074	BC-381	70-Osc♦	
L3	Input IF	16Ω	16Ω	95-1101	16-6666	BC-368	012-C1	
L4	Output IF	17Ω	17Ω	95-1102	16-6770▲	BC-355	12-C6	

*Part No. S-21634 used in chassis 5R03 & 5R07. Part No. S-22747 used in Ch. 5L07.
■Part No. S-18616 used in chassis 5R03, 5R07, & 5L07.
♦Disregard tap on secondary winding.
▲Use adaptor plate & cut out center spade bolt mounting support.

MISCELLANEOUS

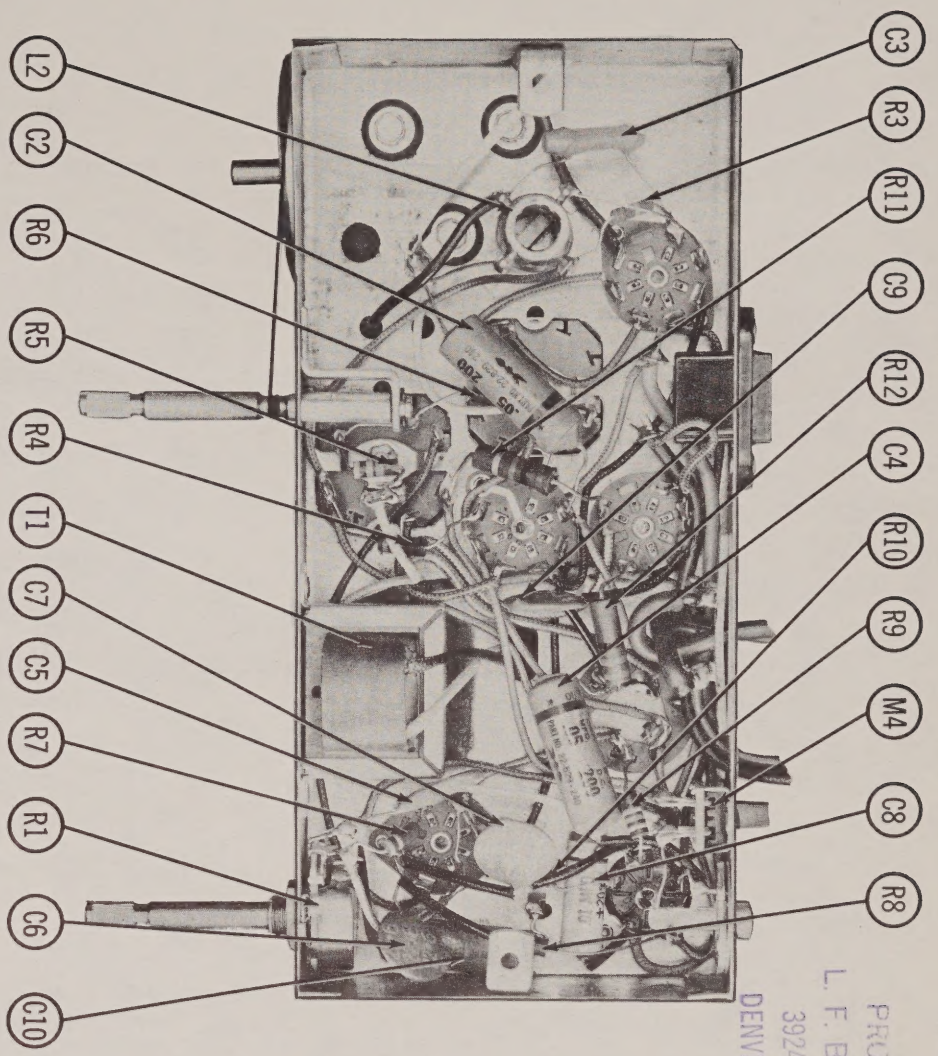
ITEM No.	PART NAME	ZENITH PART No.	NOTES
M1	Dial Light	100-67	Radio-Chassis 5R03
M2	Dial Light	100-51	Clock-Chassis 5R03
M3	Tuning Cap.	22-2583	2 Gang (25-470MMF, 26-170MMF)
M4	Switch	85-435	Radio-Phono (DPDT Slide Type)-Not used in all versions.
M5	Clock Assy.	S-22552	Models T522R, W, G, V, F.
	Clock Assy.	S-21664	Models R521F, G, R, W, Y.
	Clock Assy.	S-21601	Models R519R, W.
	Cabinet	14-1711	Model R519R
	Cabinet	14-1711 or 14-1781	Model T522R
	Cabinet	14-1712	Model R519W
	Cabinet	14-1712 or 14-1782	Model T522W
	Cabinet	14-1713 or 14-1783	Model T522G
	Cabinet	14-1714 or 14-1784	Model T522F
	Cabinet	14-1715 or 14-1785	Model T522V
	Cabinet	14-1716	Model R521R
	Cabinet	14-1717	Model R5214
	Cabinet	14-1718	Model R521G
	Cabinet	14-1719	Model R521W
	Cabinet	14-1720	Model R521F
	Knob	46-1307	Volume & Tuning
	Knob	46-1312	Clock-Alarm, Radio & Auto-Off Switch

TUNING GANG FULLY CLOSED



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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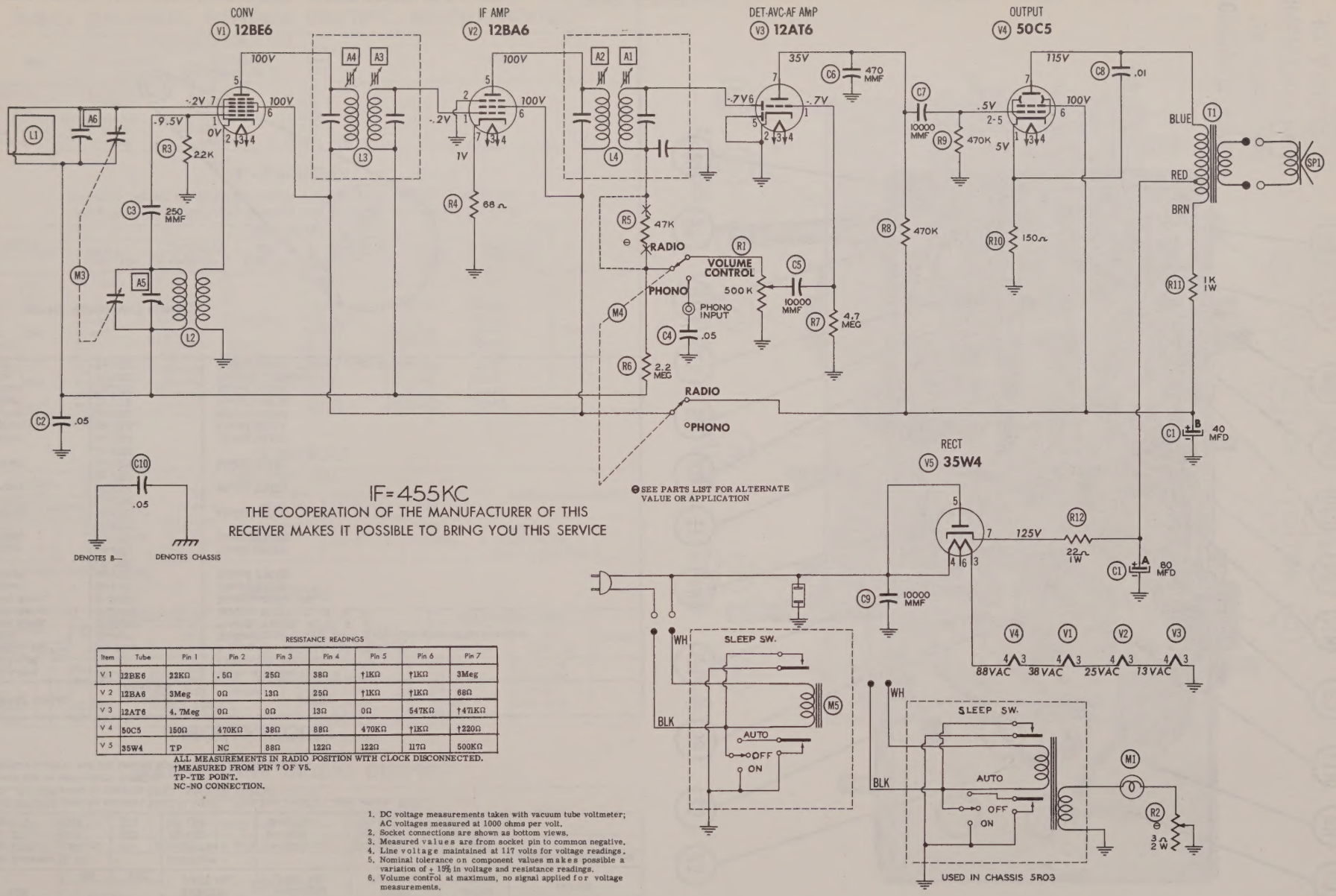
ZENITH
Models R519R (Ch. 5R07)



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	. 5Ω	25Ω	38Ω	†1KΩ	†1KΩ	3Meg
V 2	12BA6	3Meg	0Ω	13Ω	25Ω	†1KΩ	†1KΩ	68Ω
V 3	12AT6	4. 7Meg	0Ω	0Ω	13Ω	0Ω	547KΩ	†47KΩ
V 4	50C5	150Ω	470KΩ	38Ω	88Ω	470KΩ	†1KΩ	†220Ω
V 5	35W4	TP	NC	88Ω	122Ω	122Ω	117Ω	500KΩ

ALL MEASUREMENTS IN RADIO POSITION WITH CLOCK DISCONNECTED.
†MEASURED FROM PIN 7 OF V5.
TP-TIE POINT.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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